RAILROAD GAZETTE

FRIDAY, MAY 11.

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Contributions.

Long Runs.

BUFFALO, N. Y., May 7, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your article of May 4 on long runs there is one point that you did not mention, and that is the advantage to the men. Most men kick as a matter of course when their runs are lengthened. In the first place many of these changes take men away from home overnight for the first time, but beyond that it is natural to object to *any* change, and no doubt a change to *shorter* runs would in many cases cause complaints as loud as any we have heard yet. But the tendency among the companies is now such that I believe long runs, so long that the men must stay away from home at least half the nights, are now inevitable on the large roads and we must put up with it. But if the hours are not too wearing there is an advantage in having a day or two a week to yourself, and for my part I think this is worth reckoning. The feeling that one cannot be off half a day to help his wife select a new carpet or to visit a dentist, without losing time, is oppressive. My main object, however, in writing to you was to say a word on the Sunday question. Some men have conscientious scruples, more or less religious, against working Sunday; but others are always ready to make an extra dollar. These last are always numerous enough to keep the Sunday traffic running full blast, so that others, who do not wish to work on Sunday, are never free from the feeling that they may be called upon in case of a rush, and so they do not feel easy. But where men can earn $5 to $10 a trip, and make a trip in less than 15 hours, there is no excuse for any man working seven days in a week. To make everything perfectly fair for all the men, every company should have a regulation that each man must lay off at least 24, or perhaps 36, hours at one time in the course of each week. Then all would be on an equality, and nobody could complain. P. L. L.

[The point on Sunday work is well taken. Sunday railroad work is in an anomalous condition, both managers and employés engaging in it from almost contrary motives. One road runs passenger trains because Christian people are supposed to demand them. Another runs them to make money. Whatever kind of people they are run for, all kinds must be admitted to them, so that the highest motives inure to the benefit of gamblers or prize fighters, perhaps. Employés of one class work reluctantly, fearing that their standing with their employers will suffer if they refuse. Others are glad of the chance to increase their weekly pay one-seventh. All the best sentiment of the country agrees that one day in seven should be alloted to rest. The Christian sentiment of the country demands that Sunday be the universal day of rest, because an essential condition of rest is quiet, and quiet is unattainable if part of the community keeps up the din of business. Railroad managers agree nominally with this view and avow themselves in favor of restricting Sunday traffic as much as possible, but the pressure of competition, especially in long-distance traffic, continually increases, and Sunday trains are more frequent. If one road, following its instincts to reach out after every dollar in sight, runs suburban Sunday trains to stimulate traffic, its competitor must then run similar trains ostensibly as a necessity—a "concession to the demands of the public." But so far as the labor question is concerned, the only consistent course is the one advocated by "P. L. L." If a man works better during six days for having rested since the previous six, it is for the advantage of the employer as well as the employé to enforce the rest-day. If one *must* work on Sunday he should rest on Monday or some other day. In one view of the matter, the men who try to do one-seventh more work per week than the regular amount are guilty of over-reaching their fellow workmen. In certain trades unions in which work is done by the piece, the man who puts in more time than the regularly recognized average is looked upon as an enemy to his brethren. If he wishes to get a better income, by the piece-work system, than his fellow earns, he is expected to secure it by doing a better quality of work or doing it faster.—EDITOR RAILROAD GAZETTE.]

Some Sleeping Car Troubles.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Being first cousin or thereabouts to a railroad official, it cannot be supposed that I am desirous to add to the numerous burdens which the gentlemen who fill such onerous positions are daily called upon to bear; what with snow blockades, washouts, poor wheels, and the patent car heater man, they certainly have trouble enough; nevertheless I have my little grievance, which I think calls for ventilation, in the hope that other growlers may be induced to join me in a prolonged howl that shall possibly compel some exasperated superintendent or other official to decapitate a few dozen subs and bring about a new order of things in the department complained of. I have reference to the miscalled sleepers and drawing-room cars running on the trunk lines, East and West, with the system that is in vogue regarding their management.

Having unfortunately to make a trip monthly between the sea-board and the Mississippi, I am compelled to resort to these somnambulistic frauds in a vain attempt to woo "tired Nature's sweet restorer;" and while in the interests of science I may be willing, patiently, to suffer the company to experiment upon me, with all sorts of heating and freezing devices, still there are other and more exasperating experiences against which I feel constrained to protest.

For instance, should it not be possible to invent some system whereby when a traveler purchases a ticket registering the number of his seat or berth, such seat would be reserved for him unoccupied. Three times in two months have I had a contrary experience. In one case, after occupying a seat in the drawing-room car the entire day from 7 a. m., upon getting out at Albany for refreshments about five in the evening, when I returned I found a gentleman occupying my seat, which I had purchased "through" to New York. My coat, papers, etc., had been coolly removed and the other man having been assigned to that seat by the clerk at the depot, as his ticket showed, was apparently oblivious to the fact that he was a "squatter." The car was full, absolutely, and as there was no other seat to be had, and possession being nine points of the law, he positively refused to surrender the chair. In vain the porter and conductor patiently endeavored to explain and apologize for the mistake; it was not until much time and diplomacy had been expended and even an exhibition of some force that the gentleman was compelled to give me my own again. No doubt this was equally disagreeable to all parties, but what a commentary on the "system."

A week or two later I purchased a ticket for the sleeper at Toledo. Upon entering the car, lo! a lady calmly seated and occupying the compartment. Abashed, I retreated. The porter called the conductor: "Very sorry indeed, sir; some mistake. The lady occupies the seat as far as Cleveland. You can have the berth made up after we arrive there, which will be about 11 p. m. No other berth unsold in the car, sir." So, tired and sleepy, I waited until nearly midnight ere I could "lay me down to sleep," three hours at least later than the hour I was entitled to my rest, while the company received payment twice over for that time and distance. Is that right or just?

On my last trip going west this month, after leaving New York, when the car conductor came to take up the tickets, again there were two of us holding tickets for the same lower berth. As the other party was accompanied by a lady who occupied the opposite berth, I gave up my claim and took an upper berth without making complaint; but on the next night I was determined to avoid, if possible, a repetition of these annoyances, and I purchased my ticket at 9 a. m., after explaining to the agent the difficulty I had experienced, and requesting a proper notation and assurance that there would be no further mistakes. Will it be believed that again there sat a gentleman with the same berth assigned to him, which he had purchased at 4 p. m.? This time my back was up, and I would accept no compromise; in fact, I had decided to take the matter into the courts unless redress was made to me, and so I was compelled to endure the heated remarks of the exasperated conductor as I insisted that he surrender to me the berth I had purchased, although he had already exchanged tickets with the other gentleman.

This is no exaggeration. The annoyances, the unpleasantness, the injury to one's feelings, such a miscalled system entails upon the traveler cannot be compensated for in money. Surely it were time something better than this was adopted to give assurance that when a passenger pays for a seat or berth he will get it without having to create a sensation to obtain it. D.

[Our correspondent has had uncommonly bad luck, and it would not be fair to take his experience as that of the average traveler. Moreover, so far as we can decide from what he says, and what little we know of his routes, his complaints apply to but one of the sleeping car companies. Doubtless most of these annoyances come from the inefficiency of local agents and conductors, and especially of the conductors. That, of course, in no way relieves the management from responsibility, but suggests the old remedy—higher pay and stricter discipline. If, on the other hand, travelers can be brought to understand the heinousness of trying to get better service than other travelers by bribing employés, good discipline will be more easily maintained. The fee system now so general has gone far to breed impudence and carelessness in the employés, and to encourage the payment of low wages.—EDITOR RAILROAD GAZETTE.]

The Bradford Accident—Report of the Massachusetts Railroad Commissioners.

We have received a copy of the report of the Massachusetts Railroad Commissioners on the accident which took place at Bradford, near Haverhill, on the Boston & Maine, last January. The circumstances of this accident have already been described, but to understand the conclusions and recommendations of the commission it is well to recapitulate them briefly. At the place where the accident occurred the Merrimac River is crossed by a through truss bridge. The bridge is approached by a four degree curve about 1,200 ft. in length, beyond which is a tangent with a descending grade toward the bridge. About midway of this curve, on its outer side, a branch goes off, and this is entered by a stub switch of the Tyler design. About half way between the switch and the bridge, also on the outside of the curve, were two water tanks.

The train which was derailed was composed of 7 cars. The locomotive and the first three cars passed the switch safely and stopped on the bridge. The fourth car, a smoker, left the track either at the switch or the frog, but was hauled over the ties until it was stopped by striking obliquely against the end post of the bridge. This post resisted the shock and the car was overturned on the bridge floor, at which time the connections with the preceding car were broken. Some of the ties on the bridge were moved out of position by the overturned smoking car. The car following the smoker struck a post supporting the water tanks and brought down the tanks, crushing five persons who were in an enclosure under the tanks, as well as some of the passengers. In all 14 were killed and something over 50 injured. From all the information which the commission has been able to gather, it is concluded that the cause of the derailment was the breaking of a flange on the forward truck of the smoker. Some of the broken portions of the flange could not be found, and it is uncertain whether the original break was at the switch or further back. The broken wheel was on the outside of the curve. The flange was broken away for about 20 in., and the break extended into the tread so as to leave a width of tread of but 2⅛ in. at the narrowest place. The wheel was a chilled iron wheel, made in 1886. The fracture showed a depth of chill of from ⅝ to ¾ of an inch along the tread and of about ⅝ in the throat. The appearance of the fracture was not such as to indicate any serious defect in the iron.

The inquiry into the method of inspecting wheels showed that the inspection to which the wheels of the wrecked train had been submitted was "a lamentable mockery." One inspector testified that he examined the wheels first in the car house, where it was somewhat dark, and then outside, where it was lighter. He examined them only on the outer side, and did not rap them, but trusted to his eyesight, although the dust and grease had not been cleaned off. He thought, however, that he could detect any flaws or cracks by this examination. Another inspector testified that he examined all the wheels on the east side of the train, on which side the broken wheel was, when it stopped at Lawrence; that he always struck them with a hammer, and that about once a week, on the average, he found one that did not ring. He did not, however, in so testing the wheels examine them to see whether the failure to ring was due to the fact that the flange was against the rail or that the brakes were set, and his examination was the same whether the wheel rang or not.

In view of the conclusion arrived at by the Commissioners that the accident was due to a broken wheel, they made an inquiry as to the relative merits of chilled wheels and steel tired wheels, and the facts and expressions of opinion which they publish will be found in this issue under another head.

With regard to this particular accident, the Commissioners point out the peculiar dangers of the place where it occurred, viz.: There was a curve with a bridge at one end and approached on a down grade tangent at the other. A stub switch leads off from the outside of this curve, introducing a peculiar element of insecurity into the track, inasmuch as the moving parts are subjected to the outward thrust of trains running around the curve. Moreover, the movable switch rail, being straight, the continuity of the curve was broken and a uniform elevation of the outer rail was not maintained. Moreover, this switch is so situated that a derailment might result in throwing the cars into the river; and the position of the tank house on the outside of the curve added still another danger.

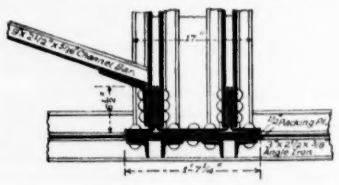
The Board takes this occasion to repeat its admonitions about guard-rails for bridges, saying that, had the guard-rails been extended along the curve, as has been recommended, or had even a single rail midway between the track rails been extended along the curve, the trucks of the smoking car would probably have been brought nearly into line before they entered the bridge. As it was, the west wheels of the rear truck either passed through the gap at the points of the guard-rails, or passed on the east side of them, and so the car was caused to swing around obliquely to the axis of the bridge. The Board also points out that the guard timbers were not notched down on the ties, nor were there spacing blocks between the ties, and consequently the bunching

of the ties at once began. Fortunately, however, the speed of the train and the force of the impact were not such as to wreck the bridge.

The Board repeats its recommendation that it should be at once notified by telegraph of any serious train accident. It recommends the removal of the tank to the inside of the curve, and that the Georgetown branch switch be carried back to some point on the tangent, or, if this is impossible, that the speed for trains going north be limited to 15 miles an hour. It also recommends that some other form of switch be substituted for the Tyler; also that a thorough examination be made of the employés engaged in inspecting wheels, and that they should be instructed in their duties and held up to a strict and faithful performance of them. As freight trains and passenger trains are constantly passing each other at speed, and as the wheels of the freight cars come from all parts of the country, and are therefore of uncertain quality, it is suggested that a rigid inspection of them is no less important than the inspection of passenger car wheels. The Board concludes by saying that this fearful accident enforces the necessity of more stringent specifications, more searching tests preparatory to the purchase of wheels, whether cast-iron or steel tired, and whether to be used in passenger or freight service, and a more scrutinizing and thorough inspection. The Manager of the Boston & Maine writes that they are putting steel-tired wheels under all new passenger cars, and have made arrangements to replace cast-iron wheels now in passenger service with steel-tired wheels at the rate of about 50 per month. They are putting in the Snow wheel.

One Hundred Thousand Pound Car, Pennsylvania Railroad.

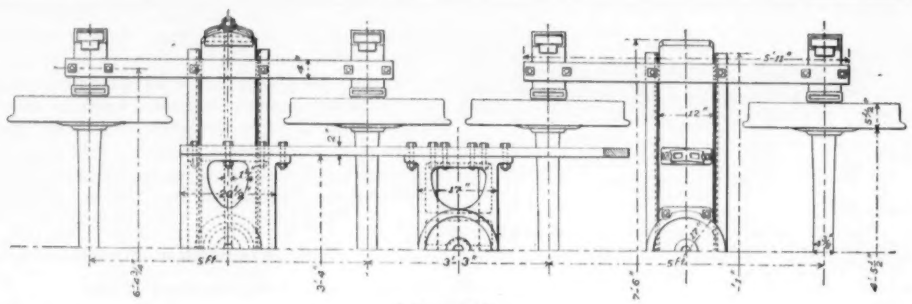
The accompanying engravings represent a very strong and heavy platform car recently built at the Altoona shops of the Pennsylvania Railroad, and especially designed for carrying



Detail of Framing,
Showing connection of
Outside Sill, Body Bolster and Diagonal Sills.

wire cables for street railroads. These cables are wound on large reels, one of which is shown in solid lines on the general diagram of the car. The dotted lines show the position when two reels are carried simultaneously.

It will be seen that the car has an iron framing and that the



Half Plan of Truck.

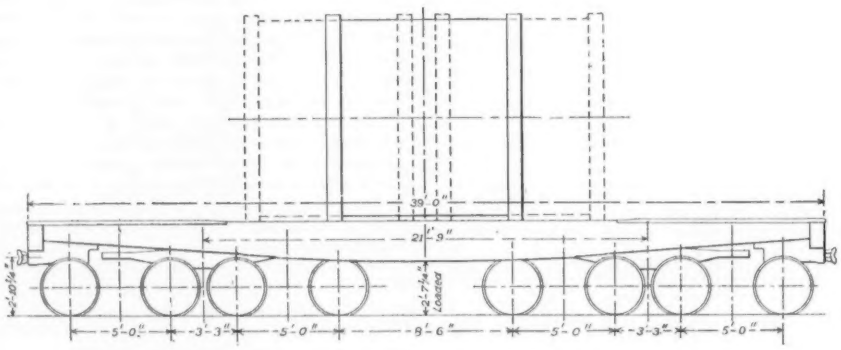
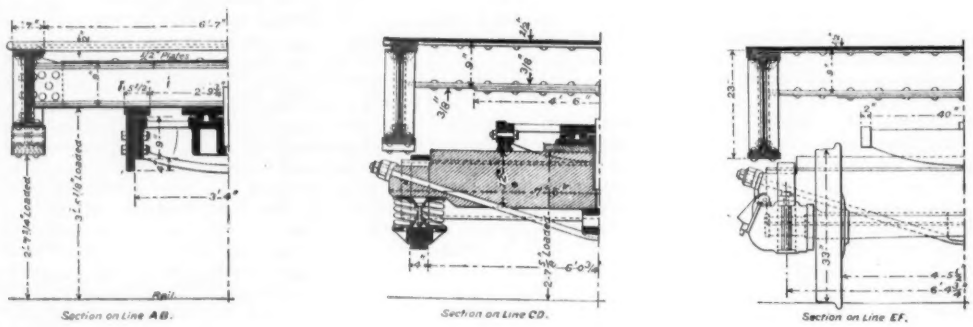
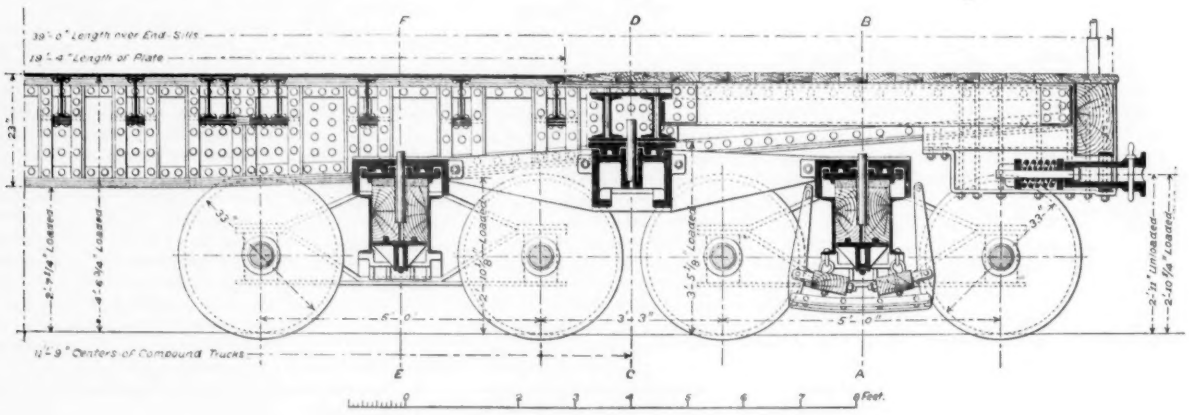


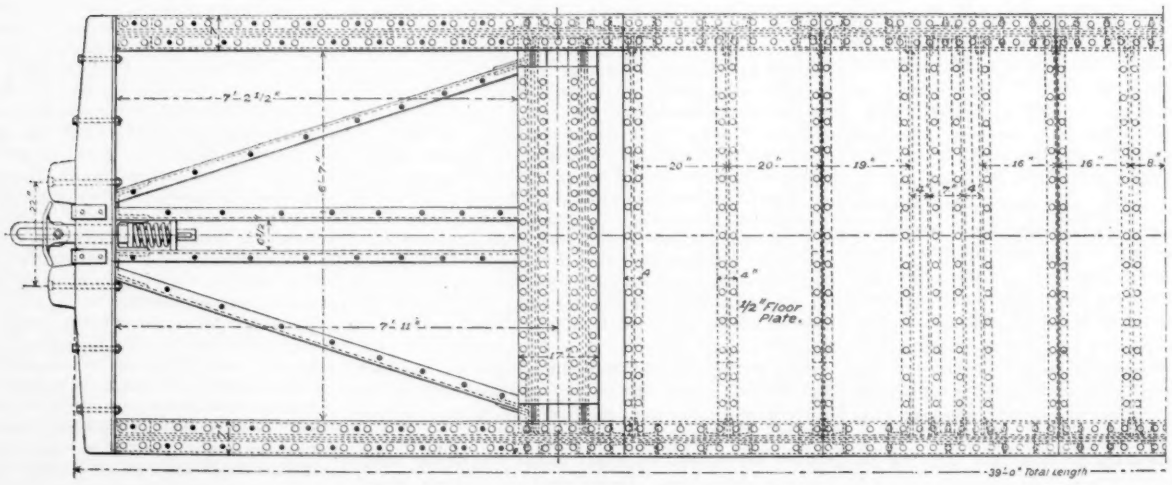
Diagram Showing General Dimensions.



Cross Sections.



Half Longitudinal Section, Showing Truck, etc.



Half Plan, Showing Iron Floor and Frame.

ONE HUNDRED THOUSAND POUND CAR, PENNSYLVANIA RAILROAD.

floor in the centre portion of the car, where the load is carried, is also of iron. The floor is carried by iron cross girders, resting on two fish-bellied iron sills.

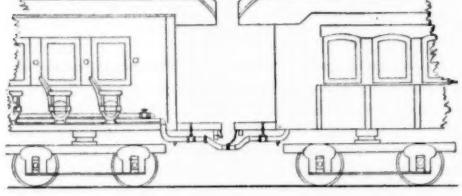
The car is designed to carry 100,000 lbs. in the centre, but would probably safely carry 120,000 lbs.; but the weight of the car and load has been limited to about 150,000 lbs., for other reasons than the strength of the car. The weight of the car empty is 51,800 lbs.

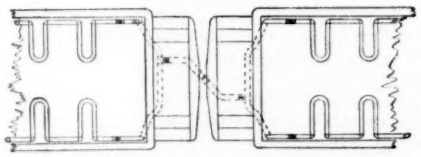
It will be seen that the car when loaded weighs more than any locomotive running; but as the load is distributed amongst sixteen wheels the effect on the track and bridges would probably not be so severe as that of many modern locomotives having a smaller total weight concentrated on a shorter wheel base and on a smaller number of wheels.

Continuous Heating on the Portland & Ogdensburgh.

The system of heating shown in the illustration has been in use on all the passenger trains of the Portland & Ogdensburgh since the beginning of last winter. This has been a very severe practical test, and, it is stated, has fully proved the efficiency of the system. The road in question runs through the White Mountains, and trains have been frequently exposed to a temperature of 20 degrees to 35 degrees below zero; but there has never been the slightest difficulty in keeping all the cars thoroughly heated.

A main pipe (1½ in.) runs through each car, and in addition there is a system of 1¼ in. pipes under the seats. This gives about 1 sq. ft. of heating surface to 25 cu. ft. of space inside the car. The circulation in the 1¼ in. pipes is controlled by a globe valve at each end of the car, so that it can be partly or entirely shut off, thus regulating the heat as the weather may demand. In baggage cars the main pipe passes along the top of the car inside and the car is heated by a very simple arrangement of radiating pipes. In passing from car to car the hose is kept very near the line of the draw-bars, thus keeping the hose short and avoiding any sag or "pocket" to catch condensed water and impede the circulation of steam. The Dunham coupler is used.





There are no traps of any kind. Condensed water is allowed to run off through an ⅛-in. pet cock at each end of each car. This is found sufficient in any ordinary weather, but in extreme cold, when the condensation is greater, any accumulation of water is easily discharged by opening a cock at the rear of the train, which is operated from the platform of the car. The pressure of steam from the engine is controlled by a Curtis regulator. The maximum pressure used has been 5 lbs., and it has been amply sufficient in all cases, even in the severest weather. In moderate winter weather, *e. g.*, 15° to 20° above zero, 2 lbs. furnished all the heat needed. The system is devised with a view to two objects: to keep as much of the piping as possible inside the car, thus avoiding loss of heat by radiation; and to secure as free circulation of steam as possible, a point of the greatest importance both to successful heating and economy in use.

Thorough test has been made of the amount of coal required to furnish the steam for heating. This has been done by comparing the number of pounds of coal burned per car mile for four months of this last winter on all trains using steam heat with the amount burned in the same time during the preceding winter on the same trains making the same time with the same engines and men. This shows the increased consumption of coal to be .85 lb. per car mile, costing, at the price paid by the Portland & Ogdensburgh for coal ($4 per ton on the tender), about 1½ mills per car mile. This may be safely taken as a maximum price, as the winter just past has been one of very unusual severity, extreme cold, high winds and heavy snows having prevailed almost uninterruptedly through the entire period.

The Massachusetts Commissioners on Steam Heating.

The Massachusetts Railroad Commissioners have sent to the state Senate a special report, of which the following is an abridgement:

The Board early in the present year secured the services of Prof. Gaetano Lanza, with instructions to examine the workings of the various systems of heating by steam from the locomotive in use in this state. Professor Lanza has, during the past winter, made careful examination of the merits and defects of the various systems, and of the difficulties encountered in their operation, and has lately made to this Board a full report of his investigations and conclusions. Though the difficulties have not all been surmounted, though there is trouble from the leakage of steam and from the freezing of traps and the imperfect action of reducing valves in the engine, the report made by Professor Lanza confirms the Board in the opinion that the system of heating by steam from the locomotive is not only practicable and conducive to the comfort and safety of passengers, but it is also desirable as a measure of economy that it should be adopted as the standard throughout this state, and that the use of separate heaters in or under cars should only be permitted under exceptional cases. The Board fully appreciates that it would be unwarrantable to require the companies to equip all their cars for steam-heating in season for the coming winter. During the summer the cars are in constant use, and great inconvenience to the public and loss to the companies would result if they should be taken off long enough to fit them with the required appliances. We deem it proper, therefore, to give the railroads until the fall of next year (1889) to complete the equipment of their cars with steam-heating apparatus. It is our purpose, unless otherwise instructed by legislative action, to issue a circular to the companies notifying them that all approvals heretofore granted for methods of heating, other than by steam from the locomotive, will continue only until the first day of October, 1889, and that thereafter methods of heating by the use of separate heaters in or under cars will be approved under exceptional circumstances only by special permit, and recommending the various companies to use all reasonable diligence in fitting their cars and engines with the necessary appliances for steam-heating, so that, if possible, the use of the separate heater may, during the coming winter, become the exception rather than the rule.

Steel-tired and Chilled Wheels.

The report of the Massachusetts Railroad Commissioners, on the Haverhill accident, contains some interesting information on this subject, as will be seen from the following extract:

The kind of wheels in use under passenger equipment on Massachusetts railroads is shown below:

RAILROADS.	Steel tired	Chilled.	Remarks of railroad officers.
Boston & Albany	2,732	None.	
Boston, Revere Beach & Lynn	216	198	No definite preference.
Providence & Worcester	300	236	" " "
Fitchburg	668	850	Consider steel-tired wheels best, most durable and safest.
Old Colony	774	1,524	Use 42-in. steel-tired on all new pass. equipment, 650 lbs. chilled under old.
Boston & Maine			
Western Div.	374	2,032	Steel-tired under new pass cars, and replacing chilled under old at rate 50 per month.
East. & North. Div	176	1,716	
Lowell Div	614	2,274	
Connecticut River	88	312	No definite preference.
New Haven & Northampton	16	312	" " "
Housatonic	124	Remainder of outfit.	Removing some defective steel-tired wheels.
Bost. & Providence	126	1,042	Express no preference.
New London Northern	.....	All.	

The Commissioners print the following letters:

From Theo. N. Ely, General Superintendent of Motive Power, Pennsylvania Railroad:

The Pennsylvania Railroad uses for its standard practice under both freight and passenger cars cast-iron wheels. The wheels used are made at the company's foundry at Altoona, which turns out, on an average, about 100,000 wheels each year. Owing to the large increase in the equipment, this number does not fully meet the demands of the service, and we are consequently obliged to purchase the wheels of other makers.

As many wheels are unsafe, we prepared the specification inclosed.* and have since purchased no wheels which did not meet these requirements, and have thus far been able to secure all the wheels we desire, made in accordance therewith. Other railroads now order wheels to be made under similar specifications. The tests required are not excessive and are perfectly practicable, as the wheels can readily be made by any honestly-disposed wheel manufacturer.

The Pennsylvania Railroad has in service, under passenger equipment, about 24,000 cast-iron wheels made at Altoona; the broken and cracked wheels in 1887 were about .4 per cent., or 1 in 250. Our inspection is very rigid, and we do not allow any wheels to run in which any symptom of weakness is discovered, and probably some of the wheels removed could have run safely a very much longer time were we willing to take any chances.

There are in the freight service about 350,000 Altoona cast-iron wheels—made of the same material as is used in the passenger wheels—the number of which removed in 1887, cracked or broken from all causes, was .14 per cent., or 1 in 714.

We endeavor to make our inspection of freight wheels as rigid as that of passenger, the importance of which cannot be over-estimated; especially on double-track railroads where trains pass each other at speed.

In addition to these 350,000 wheels there are other purchased cast-iron wheels in service; but as they are a small proportion of the whole number, the percentage of broken wheels would not be comparative.

There is a natural tendency of makers of cast-iron wheels who sell their product under guarantees for a certain number of years, or given number of miles, to make the wheels as durable as possible, often at the expense of strength, as toughness and durability do not always go together. The policy of the Pennsylvania Railroad has been, first, to secure as far as possible perfectly safe wheels, and next, to make them as durable as possible.

Our experience shows that cast-iron wheels can be made perfectly safe for passenger and freight service, and on the ground of safety we would not think of abandoning their use for wheels made from any other material that we know of, including the various styles of steel-tired wheels. We have about 2,500 or 3,000 steel-tired wheels in service, and, owing to the numerous parts of which many of them are composed, the percentage of failure is larger than in the case of cast-iron wheels. As there is a limit to the diameter to which cast-iron wheels can be made to advantage, steel-tired wheels will necessarily come more or less into use; and even smaller diameters of steel-tired wheels are preferred by some railroads.

Our records show that the best, safest and cheapest steel-tired wheel is one having a centre of either spokes or disks of wrought iron, with the tire fastened by the "Mansell" or "Gibson" retaining rings. Such wheels can be made by any manufacturer, entirely free from patents. I say this without wishing to disparage any of the steel-tired wheels which are now made in this country, many of which are very carefully and honestly put together, and are, undoubtedly, safe as long as they are kept in order. The use of good strong wheels benefits the public as well as the railroads.

From J. N. Barr, Superintendent Motive Power, Chicago, Milwaukee & St. Paul:

[In this communication the term "broken wheels" includes also those that were cracked.]

. . . During 1887 we had 25 steel-tired wheels fail from breakage, and 50 cast-iron wheels. These numbers are just about proportionate to the number of steel tired and cast-iron wheels running. In January, 1888, we had 11 steel-tired and 8 cast-iron wheels break, being a total of 19. Nearly all of the cast-iron wheels in service on this road are made by this company. My experience, both on this road and on the Pennsylvania, is that steel-tired wheels are more liable to break than good cast-iron wheels. With steel-tired wheels every year of service increases the liability to breakage, and we have nearly reached the time when a sufficient number of steel-tired wheels are running to demonstrate in general that they are no safer, and not as safe, as a cast-iron wheel.

Cast-iron wheels are made to meet the market, and a comparison of the strength of the different wheels shows that subjecting them to a blow on the outside single plate of a 100 lbs. drop falling 7 feet, the average number of blows required to break a piece out varies from 3 to 130 blows. Our own make of wheels will stand not less than 50, showing the wide variation of strength in cast-iron wheels.

Steel-tired wheel makers endeavor to keep up the quality of the wheel, which so far has been successful, but business competition is increasing, and if competition becomes so close that the quality of the material and manufacture in steel-tired wheels is deteriorated, as in the case with cast-iron wheels, they will be even more dangerous than cast-iron wheels. Possibly the operation of rolling a tire, forming the flange and forming the inside projection by which the wheels are always bolted, produces a lack of uniformity of the metal, making it liable to split. We have had a number of wheels break in this way. In a good cast-iron wheel we have the following condition: The wheel is in one piece, which, of course, removes any difficulty of parts coming loose; the tread is hard and unyielding, and in good wheels of uniform density presenting a surface to the rail of just the right condition to meet the requirements of the service. These peculiarities, the wheel being in a single piece, the body somewhat elastic and the tread excessively hard, seem to meet the requirements of the service better than any other construction. Specifications could be made for cast-iron wheels which would insure a far safer wheel than any steel-tired wheel with which I am at present familiar. There has been a meeting of a committee of the Cast-Iron Wheel Makers, the Master Car-Builders' and the Master Mechanics' Association, and a preliminary set of specifications have been drawn up which would exclude nine-tenths of the cast-iron wheels made in this country. They can, however, be lived up to, and if they had been in the past steel-tired wheels would never have gained a foothold.

From Herbert Wallis, Mechanical Superintendent, Grand Trunk of Canada:

This system, including the old Grand Trunk and the Midland, operates 558 passenger, including Pullmans, and 13,120 freight cars, including snow plows. The number of wheels in service under these cars is 109,564, of which 4,604 are in service under passenger and 104,960 under freight cars. The cast-iron wheels are chiefly made by Messrs. McDougall & Co. of Montreal, and the Detroit Car Wheel Co. * * * Cast-iron wheels are used entirely under the freight cars of this company.

The standard passenger car wheel has a centre composed of wrought iron or cast steel, either in the form of a disk or of spokes, giving with a 3-in. tire an outside diameter of 43 in. when new. Of these wheels we have 3,188 in service, or nearly 70 per cent. of the total in use under passenger cars, the balance being all cast iron.

I first introduced the steel-tired wheel of large diameter into this continent in 1875, using the spoke wheel built up in sections and welded by hydraulic pressure. This wheel has been largely used in England for all classes of service. I have latterly introduced corrugated disk wheels made by Messrs. Krupp, the Phœnix Co. and the Bochumer Verein in wrought iron and cast steel, with the object of getting rid of some difficulties which have arisen from imperfect welds. The wheel manufactured by Messrs. Krupp & Co. in wrought iron being a coiled disk, and therefore welded, does not get over this difficulty as well as if made of cast steel; but I have not yet had sufficient experience of the disk wheels to enable me to form a correct opinion as to whether it would be policy to continue their use as against the wrought-iron spoke wheels before referred to. We are ordering them, however, at present.

The tires, after being shrunk on the wheel centres, are secured by the Mansell retaining ring, which prevents the tire getting away in case of breakage. This make of fastening is largely used in Great Britain. There have been no cases of damage caused by the breakage of a tire on this railway with this class of fastening. * * *

The average mileage per tire has been something over 162,000, with a maximum of over 500,000, and a minimum of 6,000.

The mileage obtained from a tire depends upon its hardness and ability to resist abrasion. The problem which tire makers have to solve is how to combine hardness and toughness in such a manner as to obtain the maximum of strength and wearing quality.

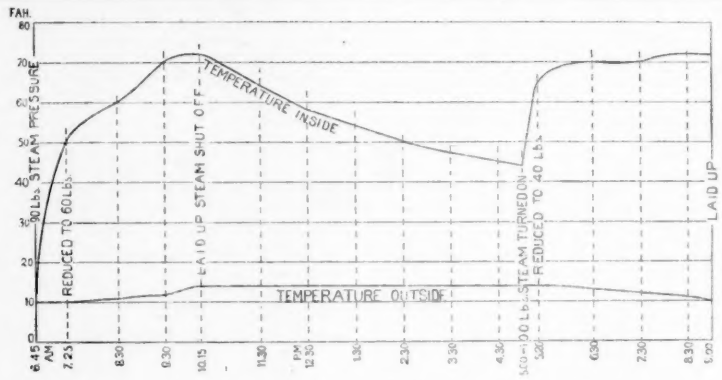
The quality of the tires recently received has not been as satisfactory as that of those which were put in during the early part of our experience, and therefore the average mileage (by no means an unsatisfactory one, however) could be increased by an improvement in the quality of the steel.

Only two accidents have happened through failure of wrought-iron wheels, and in neither was the result serious, though these failures prompted me to consider the use of disk centres.

We test cast-iron wheels by striking them four swinging blows on the hub with a 40-lb. hammer. This test is not severe and is used merely to find out flaws or incipient cracks from unequal contraction and want of proper annealing. It answers its purpose, though it does not prevent the wheel breakage which seems unavoidable at times—particularly in the winter—with cast-iron wheels.

There have been discarded for breakages or cracks, during the past year, 154 cast-iron wheels from passenger and 2,179 from freight cars, being at the rate of 8 per cent. in the

* The Pennsylvania specification for chilled wheels is here given, but does not differ very materially from specifications previously given in these pages. Mr. Barr's specification for chilled wheels was given on page 833 of our issue of Dec. 23, 1887, and the New York, Lake Erie & Western specification was given on page 138 of our issue of March 2, 1888. The Pennsylvania differs from this in requiring wheels to stand a pressure of 90,000 lbs. instead of 60,000 lbs. in forcing on the axle, while the variation from a true circle when tested with a ring must not exceed 3-32 in. instead of 1-16 in. The Pennsylvania specification contains no clause as to guaranteed mileage.



Test of Gold Storage Heater.

Car No. 902, Delaware, Lackawanna & Western.

former and 2 per cent. in the latter, per annum. To these breakages the first four months of the year contributed 82 per cent. in passenger and 44 per cent. in freight service, showing the destructive influence of a rigid road-bed.

From G. W. Rhodes, Superintendent of Motive Power, Chicago, Burlington & Quincy:

* * * Under passenger equipment, which includes passenger, baggage, mail and dining cars, we have 296 forty-two inch steel-tired-wheels, 116 thirty-three-inch steel-tired wheels, 2,680 thirty-three-inch Bouton cast-iron wheels.

Of the 296 steel-tired wheels the largest number are paper wheels. There are also some 30 or 40 Paige steel-tired wheels.

Of the 116 thirty-three-inch steel-tired wheels the largest number are also paper steel-tired, with about 40 Washburn wheels. Our freight equipment is fitted exclusively with cast-iron wheels. Our material specification for wheels of all classes is one-third Salisbury iron, one-third Hanging Rock and Southern pig irons, one-third old wheels.

We removed no broken cast-iron wheels under passenger equipment in 1887, and there were only a few cases of cracked flange and rim of wheel cracked, but no more so than we have had with steel-tired wheels. One 42-in. steel-tired wheel under a mail car split through the centre in service and one 42-in. paper wheel under a Pullman car broke through the tire, letting a large piece out which derailed the train. In the latter case the tire was worn too thin, having reached ⅜ in. thickness. * * * Under our fast passenger car service we are now advocating the use of a 42-in. wheel, and inasmuch as this size of wheel when made of cast iron is so exceedingly heavy and also difficult to manufacture, we are now advocating the use of a lighter steel-tired wheel. For all other services we are using cast-iron wheels.

From Pullman Palace Car Company, under date of Jan. 27, George M. Pullman, President, the following:

* * * About twelve years ago we put a number of the Allen paper steel-tired car wheels under some of our cars running between Chicago and New York, and, after a trial of the same, adopted them as our standard wheel, and now have in service, in all sections of the country and in Mexico, over 11,000.

Safety, economy and smoothness in running are the strong points considered by this company in equipping its cars with paper wheels. Over 3,000 of these wheels have exhausted their original tire and the centres have been re-tired, some twice and some for the third time. Of the 3,000 wheels which have been re-tired, the first tires made an average mileage of 340,843 miles per tire in service, and our mileage statistics show the service of each successive tire to be equal to that of the first; also that there is less liability of the axle breaking from crystallization when used with paper wheels.

Very few tires have broken in service during the years we have used this wheel, and in no case has a passenger been injured by their breakage. In some notable cases a car with a broken wheel was able to travel several miles without derailment or damage to the car—due, in our opinion, to the fact that the paper centre will not fracture or break as in case of metal centres.

From George Hackney, Superintendent of Machinery, Atchison, Topeka & Santa Fé:

We do not use cast-iron wheels under our passenger equipment.

The tire of a paper car wheel when new is 2⅛ in. thick, and the average life is 3 years 9 months. The average run for $\frac{1}{16}$ in. wear of the tire is 14,000 miles. Formerly we ran tires down to ¾ in. thick, making the average life of a tire 280,000 miles, but experience shows that it is not safe to retain a tire in service after it is less than 1 in. thick.

Cast-iron wheels are guaranteed for three years' freight service, and their average life is 5 years 3 months, and they run between 57,000 and 60,000 miles (estimated).

During 1887 3,524 paper wheels were purchased for new equipment and 230 for old equipment, these figures including wheels for both cars and locomotives.

FAILURES OF PAPER WHEELS, 1887.

	Engine.	Coach.
Broken hub	3	..
" plate	1	..
" bolts in plate	..	1
Tire broken	..	2
" split	..	1
Total	4	4

The cost of re-tiring a paper wheel is $53, and the guarantee for the tire is 200,000 miles.

The Commissioners comment on these letters as follows:

While the foregoing authorities differ on the question whether a steel-tired or a cast-iron wheel is the better, they all agree that if cast-iron wheels are to be used they should be manufactured in accordance with carefully drawn specifications, and should be subjected to thorough test before use. The statement made by Mr. Barr, of the Chicago, Milwaukee & St. Paul Railway, that nine-tenths of the cast-iron wheels in use would fail to conform to such specifications as should properly be made, is startling, but without doubt true. Statistics seem to prove, moreover, that the best of steel-tired wheels are safer than the best of cast-iron wheels. It is certainly an element in favor of the steel-tired wheel that it will do the work of between five and ten cast-iron wheels.

The managers of the main lines of road in this state generally agree that the steel-tired wheel is the safer and better wheel for passenger service.

The Boston & Maine, on its western, eastern and northern divisions, has 550 steel-tired wheels in use, and none of these were broken or cracked during 1887, while 18 of the 3,748 chilled wheels in use were found broken or cracked. This is 1 in 208, or a slightly higher proportion than on the Pennsylvania. The Atchison, however, which uses steel-tired wheels only in passenger service, reports only four failures in 3,866 wheels on passenger cars, or 1 in 966, while the Boston & Albany Railroad, with 2,732 steel-tired wheels, reports not a single failure from breaks or cracks. These differences in results may be attributed to differences in road-bed or to greater care in inspection, but they should serve as a guide-post to the goal of safety.

The indications derived from statistics in this country that the steel-tired wheel is the safer are abundantly confirmed by the returns from the English roads. From the reports of the British Board of Trade it appears that in Great Britain chilled cast-iron wheels are not used. The body of the wheel is made of wrought iron or wood, and the tire of wrought iron or steel. An essential feature of the wheel is the retaining ring, clip or other device by which the pieces of the tire are kept in place after breakage. So far as the body or core of the wheel is concerned, substantially absolute safety has been obtained.

We are indebted to Prof. C. F. Allen, of the Massachusetts Institute of Technology, for the following deductions from said reports: During the past ten years only 104 passenger car wheels have failed in Great Britain, or one failure per 15,000 wheels per annum.* No one has been killed or injured during the last seven years by a failure of tires, and none have been killed and only five injured during the last 11 years.

The following table gives the price that could be paid for the four classes of steel tired wheels, *a*, *b*, *c* and *d*, using the same capital as is necessary for the respective classes of cast-iron wheels, interest being reckoned at four per cent.:

	— Cast-iron wheels—	
Steel-tired wheels.	Class 1.	Class 2.
Class *a*	$47.00	$32.00
Class *b*	77.00	51.00
Class *c*	69.00	13.60
Class *d*	90 00	36.00

Remembering that the cost of steel-tired wheels is generally over $50, it is clear from these figures that a cast-iron wheel of Class 2, *i. e.*, one which, costing $12.50, would last for a period of two years, would be considerably more economical than any of the steel-tired wheels considered, excepting those of Class *b*, of which the mileage is assumed to be 480,000. This average mileage has not yet, however, been attained. On the other hand, while some authorities claim that the mileage of good cast-iron wheels, under passenger traffic, will not exceed 30,000 miles on the average, other authorities state that it will run up to 60,000 miles.

Comparing steel-tired wheels with cast-iron wheels of Class 1, there is but little difference in cost. It cannot, therefore, be stated absolutely that cast-iron wheels are cheaper than steel-tired wheels. Some classes of cast-iron wheels are cheaper than some classes of steel-tired wheels, and the reverse is also true. The difference in cost is not such as to override questions of comfort, convenience and safety.

The Gold System of Continuous Heating.

The Gold system of continuous car heating as lately applied to some passenger cars on the Delaware, Lackawanna & Western, comprises four storage pipes 5 in. diameter, three of these pipes being 20 ft. long, and the fourth being 16 ft. long. The storage pipes are slightly inclined upward toward the centre of the car. Four traps are placed under the centre of the car or in connection with one of the storage pipes and slightly higher than the latter. The traps are thus inside the car and consequently are kept warm, so that the drip is not likely to freeze and block the drip pipe. Blow-off cocks are placed at the lower end of the storage pipes, and the latter are emptied when the car is left for the night, the rule being that when the car is left all the valves should be opened. In this way no accumulation of water can take place in the traps. A trap is also placed under the platform of each car and drains the small portion of pipe which is outside the car at the ends and under the platforms. The drip pipes from the traps are 2 in. diameter, so that if the water that escapes freezes as fast as it gets out of the trap, it can hardly plug up the drip pipe.

The accompanying diagram shows the effect of the Gold system of storing heat in a car. The lower curve shows the temperature of the external atmosphere and the upper curve the temperature of the air in the centre of the car. It will be seen that the temperature rose gradually when steam was turned on, and that the body of salt water contained in the sealed pipe maintained the temperature of the steam after the supply from the engine was cut off. Consequently, the temperature of the car fell very slowly, and only reached 45° after several hours. It is evident that even when the temperature in a car falls to 45°, the pipes would still be about 100°, and as they are near the feet the car would be more comfortable than the mere temperature, 45° in the centre of the car, implies. It would also be possible to maintain the heat for a much longer period by simply increasing the size of the storage pipes. Their heat storing power would evidently vary approximately as the squares of their diameters, and a 6-in. pipe would probably store heat for 50 per cent. longer than a 5-in. pipe. The additional heat radiated by the increased surface of the larger pipe can be neutralized by wrapping thin sheet iron round the storage pipe. This retards the direct radiation, as it forms an additional covering to the pipe and prolongs the period during which it radiates heat into the car.

* See *Railroad Gazette*, page 183, March 23, 1888.

The diagram shows very clearly the temperature at different times, and the efficient manner in which the temperature was maintained shows that a train fitted with this device could be detached from the engine and remain at a comfortable temperature for some considerable time.

The following table shows some similar observations as to temperature taken on the same car on a different date. The figures show that while the outside temperature fell 4 deg. between 11:30 a. m. and 5 p. m. the temperature in the car fell only 3 deg., though steam was shut off from the engine. The temperature was therefore wholly maintained by the heat stored in the salt water in the storage pipes which form one of the special features of the Gold system.

DELAWARE, LACKAWANNA & WESTERN, CAR No. 902.—TEST MADE ON MARCH 22, 1888.

Steam turned on at 7:00 a. m. with 90 lbs. pressure. Gold Storage Car Heater.

Time.	Temperatures. Car at centre. Deg.	Outside. Deg.	Lbs. pressure.	Remarks.
7:00 a. m.	59	28	90	
7:25	59	28	30	Pressure reduced.
8:30	62	28	30	
9:30	65	28	30	
10:15	68	28	30	Laid up at Binghamton.
11:30	67	28	0	Steam shut off.
12:30 p. m.	67	28	0	
1:30	66	27	0	
2:30	66	26	0	
3:30	66	26	0	
4.30	66	25	0	
5:00	65	24	90	Steam turned on.
5:30	70	24	30	Pressure reduced.
6:30	72	23	30	
7:30	72	22	30	
8:26	72	21	30	Steam shut off.
8:40	72	20	0	Laid up at Syracuse.

On another occasion, when the outside temperature was 14 degrees Fahr., the temperature of the car fell from 64 degrees to 44 degrees in 5 hrs. 30 min., the steam being shut off. This more rapid fall of temperature was probably caused by ventilators, etc., being left open. Other observations show a mean between the results given above.

Steam Excavators.

Among the papers presented at the current meeting of the American Society of Mechanical Engineers, at Nashville, is one on Steam Excavators, by W. L. Clements, of the Industrial Works, Bay City, Mich. Mr. Clements considers in general the requisites for such machines and then describes in detail, with ample illustrations, the excavator made by the Industrial Works. He divides the portable steam excavators for land use into two general classes, first, those which are made to be readily taken apart for transportation, and, second, a machine designed to move on its own wheels and, if required, by its own power over standard gauge tracks. To this latter class belongs the machine which he particularly describes.

The body of the car upon which the boiler, engine and machinery are mounted should, in the opinion of Mr. Clements, be made of I-beams or channels, securely riveted, with wrought iron end sills, and an iron frame throughout, not only in order to better withstand the effects of climate, but also the effects of the severe shocks and strains to which the machinery is subjected.

The movements of the dipper require an appliance to thrust the dipper into the bank, in addition to hoisting, and there are many methods of accomplishing this successfully—one by means of an endless chain attachment, giving motion to a rock and pinion gear; another by a pair of engines applied directly to the rack of the dipper handle; and another by using steam direct in a cylinder, the motion of the piston-rod being communicated directly to the dipper. This last form is that adopted in the machine described. The piston-rod is attached to the dipper handle, which is bolted to side-arms on the dipper. The control of the motion of the dipper is through the dipper cylinder valve. Steam is admitted through the trunnion bearing on one side of the cylinder and exhausted through the other. The steam ports are arranged very similarly to those of an engine cylinder with a sliding valve, except that the valves are arranged about the centre, and the movement of the hand wheel in any direction opens the valve and admits steam to either side of the piston, while the opposite port is open to the exhaust. The arrangement gives a strong and steady motion to the dipper, is quickly and easily controlled and very simple.

In this excavator the crane is slewed through an angle of 200 degrees, and this movement is effected through two wire ropes, one on either side, attached to the crane sheave, which revolves about the crane post. These wire ropes are also directly connected with the piston rods of two steam cylinders. Steam is given to the front of the right-hand piston if slewing to the right is to be accomplished; to the left-hand, if slewing is to the left. The exhausts from these cylinders are so arranged for economy in steam that the exhaustion of one cylinder is partially the supply of the other. To render the motion uniform, the backs of these pistons are connected by a wire cable, which always keeps the sheave ropes taut.

The hoisting engine by which the dipper is raised has double cylinders 8 × 10 in., geared to a spool shaft on which is placed the chain drum for hoisting the dipper. This engine is also supplied with a link motion for use in the self-propulsion of the car, and is made to operate at a speed of 350 revolutions per minute.

The clutch is a positive one; and when it is remembered

that it is put in and out of gear in many hundred operations each day, its construction is important. The clutch is loose on the shaft, and has a heavy side disk or plate into which are fitted about the centre several hard steel pockets which receive the clutch pins. These steel clutch pins pass through the enlarged hub of the large gear wheel actuated by the engine pinion. This gear is keyed to the shaft and upon the pins being thrust through the hub clutch into the steel pockets of the drum disk. The shaft is hollow, and receives a pin which operates a loose disk to which the steel pins are fastened, and with the connection of the shaft pin, the operator may easily raise the dipper, or by disengaging the clutch lower it;—a too rapid downward motion being controlled by a friction stop brake, operated by the foot of the attendant. The rapidity with which an operator may clutch the chain drum, raise the dipper, while the operator of the crane cylinder is thrusting the dipper into the bank, slew the crane and dump the material, is dependent to great extent upon the experience of the operator; with a good operator the average number of dumps being about one a minute.

All of the motions of this machine are performed by steam direct, without intermediate gearing, except hoisting the dipper and propelling the car.

As to the cost of removing material by these machines, no definite statement can be made in general to apply to all varieties of work. The author gives a table, showing material moved and cost, on the approaches to the Chicago & Northwestern bridge across the Missouri River at Missouri Valley. This table was printed in the *Railroad Gazette*, Dec. 25, 1885. The report shows that for six months the average number of cars loaded per day was 205, including delays and movings, and the average cost per cubic yard was 7 cents, including the labor of loading, moving the shovel about once a month, moving track, repairs, fuel, and, in fact, absolutely everything connected in any way with filling the embankment. Other data are given as follows:

On the New York Central at Yost's Pit the largest day's work for one shovel was 174 cars; the average for one month was 121 cars per day, for another month 116 cars. Here 10,511 cars were loaded in four months, or about 95,000 yards of material. The cost of delivering on the road bed was 5½ cents per yard.

From the report of a machine working in New Mexico on the line of the Atchison, Topeka & Santa Fé, it appears that "the material which we could handle with the least trouble and the cheapest is of no use for the purpose needed. Our work has been almost wholly in cemented gravel. In this material, however, we find no difficulty under favorable circumstances in loading 75 to 100 cars per day, at a cost not to exceed 10 cents per cubic yard."

On the Cleveland, Mt. Vernon & Delaware the following results were obtained: A total of 6,915 cars were loaded with 41,490 yards; greatest number of cars loaded in a single day, 97; shovel did not average more than 6½ hours on account of waiting on cars; average cost of loading is 3 cents per cubic yard, including expense of all men around, shovel and oil, waste, etc. Loaded, hauled material, and unloaded at a distance of 10 miles from pit or shovel, at 10 cents per mile, including all costs, shovel, use of cars, engines and crews. A twenty-mile haul on this road costs 15 cents per yard, and a thirty-mile haul about 20 cents per yard.

The following report from the Superintendent of the Sioux City & Pacific gives the operations of a shovel for nine months working in a yellow clay bank from 30 to 40 ft. in length, and with a one-mile haul:

"The total number of cars loaded was 31,420 in 209 days, giving an average of 150¾ cars per day. The greatest number of cars loaded in one day was 275, with an average of 6 cubic yards per car. The average cost of loading per cubic yard is 6½ cents, including expense of all men about shovel, and shifting of shovel track. Average cost of unloading with one mile haul, 7.8 cents, including wages of all men, with trains and engines, use of cars and locomotives, with all supplies and repairs of same, making a total cost of 14.3 cents per cubic yard, or 85.8 cents per car delivered on track."

The Use of Aluminum Alloys in Steel Making.

At the April meeting of the Engineers' Society of Western Pennsylvania there was some discussion on the use of aluminum in steel making, of which we give an abstract.

Mr. P. Barnes read a brief paper in which he said that the recent interest in this subject appears to be largely due to efforts to find a market for the product of partially developed furnaces and processes. In his opinion the results thus obtained do not clearly appear to be such as to indicate a certainty that important sales will be made in the absence of a selling price which shall be at the same time practicable and safe for the producer and profitable for the consumer. If a maker of such alloys is able only to say that "after a new and larger furnace has been put at work," he will be able to sell them at certain rates, it cannot justly be claimed that any basis whatever exists upon which to estimate either the cost or value of the results, which are promised as sure to follow the use of this "material of the future."

Some of the details of quality of steel are reasonably well understood by manufacturers, and the approximate proportions of the elements upon which this quality so largely depends. Careful study has been made, also, of the requirements which must be maintained in steel structures of all sorts and classes, and the relation of the elements in the steel, offered for use in any given case, and the conditions of such use, as depending one upon the other, are substantially agreed upon by all parties concerned. Upon this basis of agreement large technical and commercial dealings are constantly in progress, and into very important fractions of these the new alloys do not seem likely to be pressed for use, judging from the assurances of the makers themselves, when the simpler requirements of steel consumers have been explained.

It does not clearly appear, at the present moment, that any new or increased stringency of specification is desired or proposed by those who use or arrange for the use of higher qualities of steel, than may be fully and certainly met by a skillful treatment of the common elements which, in all probable cases, must be present in the material. To introduce another element into the combination, and to insure a useful result from its presence, is to lay upon some one a burden of care and study, and of absolute proof, from which the strongest might shrink without discredit, and which, for the present at least, may be left without hardship or injustice to the promoters themselves of these useful alloys.

Mr. METCALF: Ever since the society was organized I believe I have had to start all the discussions, whether I knew anything of the subject or not. But I can say one thing, I know as much about aluminum as Mr. Barnes says he does. I am sure of that.

There is one side of this steel discussion, however, that I think Mr. Barnes has ignored altogether. I am perfectly sure that he is just in the position I am; that everything he makes is just right and just what it ought to be; that we do not propose spending any money or time experimenting as long as we can get people to take what we now make. But I think the man who opens the daily mail and gets all the growling letters might possibly see room for improvement in the material furnished. If we could get rid of the seams, the dirt, the laps, the slams and other things of this kind, we would be able to have much pleasanter mails come to us.

The only use I have ever heard of for aluminum in steel is to make it sound—to make the ingot sound. That was the claim made by Oestberg, before the Mining Institute here in Pittsburgh, when he showed those wonderful Mitis metal castings. He said a wonderfully small percentage of aluminum in the steel would quiet it at once. The reasons he gave for it is not necessary to discuss. They may be right and they may be wrong. I will only say that we have tried the experiment several times and have noticed that the introduction of a very small quantity of aluminum alloy into the crucible has appeared to have the effect of quieting boiling steel almost immediately, and those gentlemen who are so urgently offering their alloy for use claim that this is the chief purpose of it. We have never carried that out to any great extent, for the reason that our steel is so perfect it does not need it. We tried it just for curiosity. I did take a large lot of it (large for our purpose) for one crucible. There was about 12 per cent. aluminum. We melted it with iron in such proportion that it ought to have contained in the ingot at least five or six per cent. of aluminum, which would be about the same quantity as we found of tungsten in the so-called "self-hardening" steel, to see what the effect would be. The trial resulted in giving us an ingot that we could not hammer or roll, or do anything with. We could not find any heat at which it would work satisfactorily. We finally succeeded in getting a small piece hammered down to a size called bar size, and then tried to turn it into a tool, but without any flattering success; and so far as our experience with it went, it was the meanest piece of pot-metal we ever got hold of.

There was nothing in that experiment to justify us going to any expense in the use of the alloy of aluminum. However, it was our only experiment, and it may have been altogether wrong. The steel may not have contained the aluminum we supposed it did. It may have gone into the slag. We did not follow it up. If there had been any good results obtained from our experiment we might have gone farther.

Mr. HUNT: I understand from the venders of this aluminum alloy, and also from the people at Boston (or near Boston, at the Neponset Works) where the Mitis steel casting process is being carried out, that one of the principal advantages they claim, at least for the ferro-aluminum in steel and in iron, is the fluidity that it gives to the metal; not only, as has been said, the power of quieting the metal when it is full of gas and in violent ebullition, but it makes the metal, which was sticky at the temperature at which it was before, so fluid that it will pour just as cast iron will, flowing into very thin sections. I have been shown, by one of the agents of the Mitis people, a sample of wrought iron, to which some ferro-aluminum had been added, which had been cast into little threads that looked like a brush, and each one of these threads was as tough almost as soft wrought-iron wire and would work as well as a bristle brush; yet it had been cast from ordinary wrought iron, in a crucible to which this ferro-aluminum had been added. I have myself experimented somewhat with it, and I can add to what Mr. Metcalf has already said as to the very remarkable quality of quieting metal that is what we call "wild;" that is, has gas in it and requires settling before it will make a sound ingot. It certainly does make the metal fluid and does make it solid. The price of this alloy is something like $4 per pound—for the contained aluminum in the alloy—and it certainly should have very good qualities in order to make the steel makers wish to use it.

I can agree with what Mr. Barnes has already said, that with the present requirements for soft steel, in the specifications for structural material at least, there will probably be no demand in the near future for such an extra quality as would require $4 per pound material to be added to it to make it better. In other words, that soft steel is now being made which does answer all the requirements of the ordinary specifications without any $4 per pound material being added to it.

Mr. HIBBARD: I did not come here prepared to say anything, but I think there is a little to be said on the other side about this use of aluminum in steel. We tried it, I think, three times. The first two were, for various reasons, unsuccessful, but the third time it turned out very well. I think we made a heat of the steel about .18 carbon and .41 manganese and 1-10 per cent. of aluminum in it, and it tested remarkably well. The stock was very ordinary, about one-tenth of one per cent. phosphorus, and, I suppose, half as much sulphur. The average tensile strength of that rolled into half inch plates was about 70,000 lbs., and the elongation, I think, about 26½ per cent. That was the average of four test pieces. We thought that was very good metal for ordinary stock. I should say that without the aluminum we would have had perhaps 65,000 lbs. tensile, with probably 22 or 23 per cent. elongation. Probably the effect of the aluminum added to the steel was to make a difference of 5,000 lbs. in tensile and 3 in elongation. There was no analysis made of the different parts. The only examination made was to break an ingot in two and look at it; it was absolutely solid. The metal, some of which was put into forgings, turned up very well. The chips came off regularly and smoothly. It was excellent steel.

Mr. BRASHEAR: I think, perhaps, that there is something in the making of alloys, especially in reference to the aluminum and kindred alloys, in having the alloy made with some reference to the mixture according to their molecular weights. This factor in the mixture of metals is in a great measure overlooked. We have found that in the manufacture of metal for diffraction gratings we get the most perfect metal, the most beautiful surfaces, by making use of metals closely allied to the molecular weights, so that there will be a chemical affinity as well as a mechanical mixture. In this way we found that we got a metal infinitely superior to those metals that are made without reference to their molecular weights. We made some experiments in the aluminum bronze, and other alloys of aluminum, and got some very good results.

A claim has been set up by a company in London that they have made aluminum bars that did not oxidize even after exposure to the atmosphere of London for six months. I do not believe such a metal exists, for oxygen will attack anything if you give it time enough. A German chemist had a lot of spoons, knives and forks made from aluminum, and at the same time used some silver spoons, knives and forks. He had been under the impression that the aluminum was a non-oxidizing metal, but at the end of a year (after the utensils had had about the same use) he found that the aluminum had wasted more than the silver—had oxidized more than the silver, so that we cannot depend upon it as a perfectly non-oxidizing metal.

I cannot speak of its use as an alloy in steel, but I know it makes a magnificent alloy if partly mixed with copper, tin and other metals.

The Mechanical Significance of Viscosity Determinations of Lubricants.*

During the last ten years leading oil manufacturers and dealers have introduced the practice of determining a property of oils known as "Viscosity," as a measure of quality, not included in the determinations of "flashing point," specific gravity and "cold test," which had previously been the only means of identification adopted.

Instruments for determining this property have been termed "Viscosimeters," and in the majority of instances have consisted of a simple reservoir, out of which a certain volume of oil is permitted to flow through a small orifice, the time of such flow in seconds being the measure of viscosity.

The following table shows the viscosity of different oils as determined by various instruments:

TABLE I.

Showing viscosity of oils on three different viscosimeters operated with oils at 167° Fahr.

	Description of oil's.	Viscosity in seconds.			Ratio of visc sities.		
		Col. 2.	Col. 3	Col. 4	For Col. 2	For Col. 3	For Col. 4
1	Heavy cylinder oil, pure petroleum	346	138	523	1.00	1.00	1.00
2	Mixed oil { 90% pure petro. / 10% neatsfoot	237	73	372	0.68	0.53	0.71
3	Castor oil	210	71	356	0.60	0.51	0.67
4	Mixed oil { 70% petroleum, / 30% animal	215	62	261	0.62	0.45	0.50
5	Mixed oil { 33⅓ light paraf. / 67⅔ heavy pet.	165	55	...	0.47	0.40	...
6	Lard	70	42	114	0.23	0.30	0.22
7	Tallow		40	...	....	0.29	...
8	Sperm	63	35	81	0 18	0.25	0.15
9	Spindle oil paraffine	55	31	53	0.15	0.23	0.10

The relative values of the oils, though not identical for the different instruments, show a fairly satisfactory agreement, and the discrepancies shown are not of importance for the following inquiry.

The oils of Table I. being applied to lubricate the slide of an upright condensing engine, 44 in. diameter, 36 in stroke, making about 80 revolutions with 70 pounds boiler pressure, with 90 square inches of area in the crosshead shoes on the working side of the slide, gave results as per column 2 of Table II., the slides being at a temperature of 167° Fahrenheit.

TABLE II.

Comparing relative amounts of oil used per minute on engine slides under heavy pressure with relative average viscosities of Table I.

	Description of Oils.	Relative amounts of oil necessary to be supplied per minute to prevent wear of brass crosshead shoe from cutting black streaks to appear on slide	Reciprocals of relative viscosities from average of columns 5, 6, and 7 in Table I.
1	Heavy cylinder oil, pure petroleum	1.0	1.0
2	Mixed oil { 90% " " / 10% neatsfoot	1.6	1.61
3	Castor oil	1.8	1.66
4	Mixed oil { 70% petroleum / 30% animal	1.6	1.90
5	" " { ⅓ paraffine / ⅔ heavy cylinder oil	1.9	2.50
6	Lard oil	4.5	4.00
7	Tallow	4.6	3.40
8	Sperm	4.6	5.00
9	Light paraffine, spindle oil	60.0	6.00

A study of Table II. shows no uniform relation between the relative quantities of oil and the relative viscosity reciprocal, but it is evident, nevertheless, that there is a sufficiently direct connection between these quantities to make the oils of greatest viscosity the most economical as regards the amount necessary to be supplied in order to maintain a minimum amount of wear; for it is believed that the circumstances of the experiment were such that the quantities of oil supplied to the slide corresponded to a constant thickness of layer of oil or a constant distance between the slide and the shoe. Reasons for this belief are as follows: The slides were at each side of the engine and of the rib form, *i. e.*, the shoes of the crosshead on each side received the slide between them. The surfaces of the slides as they were uncovered by the shoes could therefore be closely observed and the thickness of oil tested by wiping the surface with the finger, sufficiently well to detect considerable variations of such thickness. Now, as

* Abstract of a paper presented at the Nashville meeting of the American Society of Mechanical Engineers by Prof. J. E. Denton.

the supply of oil No. 1, Tables I. and II., was reduced below the normal quantity in daily use, a portion of the slide on one side of the engine very soon became heavily streaked with black lather, while on the slide on the other side of the engine the oil remained clear. But on the latter side the fact of the presence of a reduced thickness of the layer of oil was very apparent by wiping with the fingers. The slide which blackened was therefore examined with a microscope and found to contain a collection of brass specks where the black lather first showed itself, and the roughening which had occurred when this brass had imbedded itself was still slightly present, so that the distance between the shoe and slide at this spot was apparently less than at any spot in the slide which showed no black lather. It was therefore concluded that if the supply of oil to the brassy slide was adjusted with different oils so that the black lather was just commencing to appear, the distance apart of the shoe and slide would be the same with each oil. The figures in Table II. are to be therefore compared on this basis, with the exception of the spindle oil. With this oil it was impossible to avoid a black lather with even sixty times the amount of No. 1 oil, and it is therefore thought that for this oil the pressure upon the slides was too great to permit the entrance of the fluid under the slide as fast as was necessary, and that the majority of the oil used flowed over the advancing edge of the crosshead shoe. The pressure per square inch of surface of the crosshead shoe was upward of one hundred and forty pounds per square inch, which is from two to three times that of the most severe modern engine practice, such as the locomotive and high-speed stationary type. The engine was performing very severe service, being coupled direct to a steel rail mill turning out the heaviest line of rails. The load had been increased beyond that for which the engine was designed, and hence the abnormal pressure upon the crosshead shoes. Oil was supplied to the slide from a vessel placed over its upper extremity and delivering the oil into a cavity in the top of the slide, whence it trickled down the three faces of the latter rubbed by the crosshead. The oil was heated to the temperature of the crosshead, 167° Fahr., before leaving the vessel by conduction from the steam cylinder. The rate of feeding was determined by catching a minute's supply in a bottle held under the stream of oil, and then weighing the contents of the bottle.

From the experiments with the engine slide described, it appears that the possible saving in the oil consumption necessary for minimum wearing away of the rubbing surfaces, due to the difference in viscosity, proves that the most economical lubricant is the oil of the greatest viscosity which will permit the oil to be fed, wherever the loss of power in friction is an element of inferior importance, as is the case in all heavy machinery.

The Pacific Roads—Report of the Engineer to the United States Commission.

The eighth volume of the testimony taken by the Pacific Railway Commission contains the report of the engineer, which was submitted last October. The report is made by Mr. R. P. Morgan, Jr., of Illinois, who was charged by the Commission with the duty of examining the Union Pacific and Central Pacific and their branches, and the Sioux City & Pacific, and of reporting to the Commission the physical condition of these roads with their equipment, and of presenting an estimate of the fair present value of the properties and of the present cost of reproducing them. There was nothing small in the task which the Commission set for its engineers. Mr. Morgan associated with him Mr. William L. Elseffer, of New York, who signs the report as Principal Assistant Engineer. These gentlemen spent a little more than 3½ months in the actual inspection of the properties on which they report. With a special train they went over the lines at an average speed of 12 miles an hour, stopping regularly every five miles, and oftener if necessary. At each stop they made careful measurements and notes of right of way, fencing, alignment and grade and formation of roadway; and of the rails, ties, and all track material in 52.8 ft. Great pains were taken to get the kind, weight and condition of the rails. At division points, shops and terminals, inspections were made of equipment, machinery and tools. In this way, by actual examination of the property in the minutest detail, it was attempted to check and verify the schedules and documents which were placed at the disposition of the engineers. The report as to the cost of reproducing the systems as they now stand, including equipment and terminals, may be summed up as follows :

	Union Pacific.	Central Pacific.	Sioux City & Pacific.
Cost of reproducing.	$120,207,120	$50,867,540	$2,372,780
Present actual value.	150,000,000	110,000,000*	3,000,000

* The report says that this *should be* the present actual value, but not that it is.

The "cost of reproducing" the roads is, as we have intimated, arrived at by actual study of the property and schedules, but the "actual present value" is based on the earning capacity of the roads. During his investigations Mr. Morgan addressed to the presidents of the Union and the Central Pacific letters asking from them suggestions or opinions as to the future earning power of their properties, with a view to supplementing by their personal knowledge the information which he might obtain from the documents available and from his examination of the country traversed. Mr. Adams replied that he knows of "few things more difficult than to form an estimate of the 'fair, present actual value' of any railroad property." It may be estimated on the cost of duplicating the property or on the probable net earnings. But he holds it quite impossible to say what would be the cost of duplicating the Union Pacific. The value of right of way and of terminals has increased from 10 to 50 times, while the cost of material would perhaps be one-half what it was when put into the road. The future net earnings of the property also are very difficult to estimate, for they will be affected by many conditions which the officers of the road cannot control. For Mr. Morgan's purposes, however, Mr. Adams assumes the net earnings at $10,000,000, which is 5 per cent. on $200,000,000, and at this sum he would put the present actual value of the property. Mr. Morgan takes the earnings of 1886 as the best measure available of its earnings in the immediate future, and, therefore, puts these at $7,500,000, after paying operating expenses, expenses of maintenance, and taxes. Thus he gets at the present actual value as $150,000,000.

Mr. Stanford declined to express any opinion whatever as to the future earnings or the present value of the Central Pacific. Mr. Morgan says: "The reports made by the company of the average net earning power of the system, if those reports can be relied upon, lead to the conclusion that * * * the net surplus should be not less than $5,500,000 per annum * * * five per cent on $110,000,000," and this he assumes as the present value of that system. He discusses very briefly the controlling conditions, and it is not quite clear why he takes $5,500,000 as the "average net earning power" of the Central. This is over $4,000 per mile for the 1,360 miles of the Central Pacific and branches, while the average of the system operated for the six years, 1881–86, was $3,273.

The way in which Mr. Morgan has arrived at the present cost of reproducing the various lines is illustrated by the following figures for 1,038.9 miles of the Union Pacific from Omaha to Ogden :

Right of way	$188,000
Grading, bridging and culverts	7,672,720
Ties	1,869,575
Main track, rails, etc	5,062,443
Side tracks, rails, etc	1,322,670
Tracklaying and surfacing	623,340
Fencing	208,000
Snow fences	250,000
Snow sheds	124,920
Buildings	1,558,350
Telegraph line	129,862
Locomotives and car equipment	4,155,620
Fixed tools, stationary power and other tools	519,500
Engineering and contingencies, 10 per cen	2,362,500
Impact and adaptat on	1,870,000
	$27,857,500
Cost per mile, $26,814 +	
Terminal properties and facilities, Omaha	$10,000,000
Ditto, Ogden	300,000
	10,300,000
Total	$38,157,500.
Total cost per mile, $36,728 +	

All of the lines estimated on are treated in this same way.

The item of impact and adaptation which appears in each estimate is not explained in the text of the report, but the principle of it is evident. By that item it is intended to cover that adaptation of the road to the purposes for which it was built, which can come only from time and use. For example, the property is made more valuable by the consolidation of the banks, by the gradual perfection of the surface of the road bed, by the permanent establishing of the channels of watercourses, and by other changes, many of which are imperceptible in their progress. Undoubtedly this is an element in the present value of the roads which should be taken into the account. How Mr. Morgan arrived at the value of this element in any one case, however, does not appear, and to the engineer who reads his report it would have been interesting had he discussed this item at some length.

The estimated cost per mile for various lines examined we have tabulated below :

	Miles.	Cost per mile.	Cost per mile including terminals.
U. P., Omaha—Ogden	1038.9	$26,814	$36,728
" Kansas City—Denver	639.4	23,315	34,263
" Cheyenne—Denver	106.5	19,878	21,593
" Denver—Gunnison and Baldwin (narrow gauge)	223.1	21,751	
U. P., Granger—Huntington	541.3	22,000	
Sioux City & Pacific	103.9	22,860	
C. P. Ogden—Oakland and Niles—San José	892.0	35,845*	43,693*

* Does not include steamers.

These figures are for lines of which but very little of the track is ballasted, and which are very lightly equipped as compared with the great eastern and middle western lines. The rails are generally steel, and 56 lbs. to 60 lbs., and the ties are reported to be of good quality and size, and in much the larger part of the distance examined they are laid from 2,800 to 3,000 to the mile. In fact, 3,000 to the mile seems to be the prevailing rule. About 40 per cent. are of soft wood, 40 per cent. oak, and 20 per cent. red-wood. These latter are reported as giving remarkable results as to life. It is stated that red-wood ties were found into which the rails had worn fully two inches, while the wood was perfectly sound. Some of these ties had been in the track more than 15 years.

In conclusion the engineers report the Union Pacific as, on the whole, in good condition, and generally as well maintained as true economy would require. Of the Central Pacific, however, it is said "the physical condition clearly demonstrates a remarkably close management. * * * for no part is permitted to be renewed until absolutely necessary."

Some Papers at the Nashville Meeting of the Mechanical Engineers.

L. S. Randolph presented a paper on "Strains in Locomotive Boilers." He laid stress on the fact that has troubled railroad master mechanics for years, viz.: the difference in expansion between the shell and the fire-box sheets. He showed the effect of unequal expansion on the boiler generally, stating that:

"In nearly every case the failure of boilers is due, except where corroded by bad water, to failures of metal, from repeated straining beyond the elastic limit by difference in rates of expansion and contraction.

"So far the use of large easy curves for flanges and very soft metal throughout the boiler are the only methods that have met with anything like success in overcoming this difficulty. Corrugated flues and fire-boxes would probably save a great deal of the trouble, but they are open to objection, especially where the coal used contains much sulphur, on account of corrosion caused by soot and ashes lying in the corrugations."

"The Mechanical Significance of Viscosity Determinations of Lubricants" was the title of a paper presented by James E. Denton. An abstract is given in another column.

Mr. Henry R. Towne read a paper upon "A Safety Car Heating System," giving particulars of a system which has been recently patented and which will, we understand, be shortly introduced in actual service by the New York Safety Car Heating Co., of which Mr. Towne is President.

"It is now generally admitted that the additional duty on the ordinary passenger locomotive, under quite severe conditions, does not exceed 5 per cent. of its efficiency, and the additional coal burned in the locomotive is but a small fraction of the amount required for supplying car stoves, of the best kinds in use, and that this economy in fuel is so great as to enable the expense of applying the new system to be met out of the savings resulting from it during a few years' use.

"The system contemplates the retention of the Baker heater, or its equivalent, and the use of hot water for the local circulating medium within each car, although modifications of the system adapt it equally well to the Spear stove, or to any other apparatus having a hot-air circulation. The description herein given, however, will be confined to the system as applied to a hot-water apparatus.

"The heater or stove in the new system possesses three functions, capable of independent or simultaneous operation, viz.:

"1. The heating of the water of circulation by means of steam from the locomotive, in the transfer chamber outside the Baker heater.

"2. The heating of the same circulating medium by the combustion of gas fuel within a combustion chamber.

"3. The heating of the same circulating medium by the combustion of solid fuel of any kind in the combustion chamber.

"The effect of heat applied by any of these three methods to the circulating medium within the coils is identical. The increase in the temperature of the water within the coils changes its density, and hence its gravity, thus causing it to rise, the volume of water thus displaced being replaced by an equal volume of cooled water flowing back from the car, the action of this part of the apparatus being precisely similar to that of any of the well-known arrangements of hot water apparatus.

"One or more gas storage tanks are provided under the car, within which gas, compressed to ten atmospheres or more, is stored for use, both for lighting and as an emergency fuel. The pipes from these tanks pass through a governor or reducer, by which the pressure is diminished to the desired tension, and from which the gas passes to the stove, where it can be conveniently turned on or off by a cock in the usual manner.

"An improved method of piping the cars for conveying steam from the locomotive, and conveying the water of condensation back to it, consists of a double line of pipes, extending from the locomotive under each car, one of which is used as a steam main, and the other as a return or condense-water main. Each of these pipes is interrupted at or near the centre of the car, and there connected with a "centre-fitting," having proper ports or passages in it, and having, also, two reversing valves, by means of which either line of pipe can be connected with the steam pipe leading to the transfer chamber in the stove, and the opposite line connected with the condense-water pipe returning from the stove. The details of this apparatus have all been fully worked out, and the 'centre-fitting' constructed, but further description of them here will be omitted. The main features of the system herein described may be utilized either with a single or double system of longitudinal pipes, connected between the cars by any proper form of coupling device.

"The normal method of heating each of the carsis by means of steam taken from the locomotive, and imparting its heat, in the 'transfer chamber,' to the water constituting the local circulating medium of the car. During periods of temporary separation from the locomotive the temperature of the car can be easily maintained by resorting to the use of gas fuel, which can be instantly ignited and as easily and quickly extinguished whenever the car is again coupled into a train. Finally, to meet the case of an emergency in which the car is isolated from its locomotive, or the latter is without steam, and in which the supply of gas fuel has been exhausted, there remains the ordinary fire-box and combustion chamber, in which solid fuel of any kind, either coal or wood, can be utilized.

"Dependence upon steam from the locomotive alone may be accepted for suburban and local trains, but for other trains, liable to detention, there must be some supplemental heating device, and for these the use of gas fuel possess many advantages. For many kinds of service, however, it will be necessary that the cars continue to have provision whereby, under exceptional circumstances, the temperature can be maintained without dependence either upon the locomotive or a supply of gas, and hence it is probable that the ordinary stove or its equivalent must always be retained. The system described combines all of these essentials in a simple and harmonious manner."

The author concludes by stating that the requisite quantity of gas can easily be carried in tanks under a car, and that the gas thus stored can heat the car for 12 hours and light the car for a longer period.

"Notes on Warming Railroad Cars by Steam" was presented by Wm. J. Baldwin.

In this paper the author detailed some experiments on the Long Island Railroad, with the Gold storage system of continuous heating, the experiments being made for the purpose of determining the quantity of steam required for warming a car, and the rate of cooling of a car after the steam was shut off. The author says :

"The deductions to be drawn from the experiment in general is (1) that 2 sq. ft. of surface per running foot of car is more than ample for warming. (2) That each square foot of surface requires heat equivalent to about two heat units for each degree the air is colder than the heater."

Mr. W. F. Mattes presented a paper on Connecting Rods, and described a form of rod adopted by the writer at the Lackawanna Works. This rod is a modification of the marine rod, but the jaws are of sufficient length to hold both boxes and the cap hooks over projections on the jaws. These jaws are turned concentric with the rod, and the cap hooks are similarly counterbored. The bolts thus merely clamp the parts together. It is claimed that this form is cheaper and better than a strap end.

Abstracts of other papers presented will be found elsewhere in this issue.

THE SCRAP HEAP.

The Disaster at Locust Gap.

On May 6, about 11 p. m., a freight train of 75 cars on the Philadelphia & Reading, while descending a heavy grade between Mt. Carmel and Locust Gap, Pa., broke in two, and the engine and 3 cars ran on half a mile before the break was discovered. The engine was then stopped, and the rear portion came on and dashed into the forward one. The third car from the engine was loaded with gunpowder or dynamite, which at once exploded with terrific force, blowing the cars and their contents in all directions, shattering many buildings and breaking windows for miles around. At the foot of a high bank on one side of, and below, the track were 17 dwelling-houses, which were completely wrecked and their occupants killed or injured. These houses were set on fire by overturned stoves or lamps, and a number of people were burned to death. One man and 7 children were killed outright, and about 25, mostly women and children, were injured.

Strike Notes.

The officers of the Brotherhood declare that the reports of last week that the Burlington strike was declared off are unfounded.

The Brotherhood *Journal* for May gives the names of nine members expelled for "scabbing on the C., B. & Q."

The Chicago, Santa Fe & California, which has just opened its new through line between Chicago and Kansas City, offered places for 15 of the Burlington striking enginemen and a similar number of firemen, but the offer was rejected.

On the night of May 3 a Burlington train of 50 cars, mostly empty, from the Union stock yards, bound for the Louisville, New Albany & Chicago yard, was derailed and set on fire by unknown miscreants. A switch was thrown under the train and 6 cars were derailed, and a car in the middle of the train was found to be on fire. The conductor of the train was found soon afterward in the ditch, badly beaten and bruised about the head. He said he had been attacked by three men who boarded the train at Thirty-seventh street. There is no clew to the perpetrators of the crime.

On May 4, the night switchmen in the yard of the Southern Pacific at Los Angeles, Cal., struck for shorter hours and the day men joined them. The latter work 10 hours and the former 13, both classes receiving the same pay.

State "Regulation" of Railroads.

The citizens of Urbana, Ind., being offended by the shabby condition of the station building of the Cincinnati, Wabash & Michigan in that town "struck" against the policy of the railroad in maintaining such a building and not erecting a new one, by blowing it up in the night with dynamite. The demolition was not complete, however, and the damage was repaired. A second effort last week was more successful, the building being burnt to the ground at midnight.

Brakemen in Convention.

A convention of the Brotherhood of Railroad Brakemen was held in Pittsburgh May 1–4. There was a large representation of the brotherhood present from all parts of the United States. The meetings on the first day were open, and in the morning an address was delivered by Grand Master Wilkinson on the aims and objects of the order, and in the evening Robert Pitcairn, Superintendent of the Pennsylvania, addressed the delegates. E. F. Usher, Grand Secretary and Treasurer; W. G. Edens, Vice Grand Master, and C. L. Foster, Grand Organizer and Instructor, were present. The meetings on the succeeding days were held with closed doors.

Punishment of a Defaulter.

Charles W. Foster, a freight clerk of the Philadelphia & Reading, in Philadelphia, ran away to Cuba in March last with $800 of his employer's money. He eventually returned as far as Norfolk, Va., where he was caught by his bondsmen, the American Surety Company, of New York, and brought back to Philadelphia, where he has been sentenced to 18 months in the penitentiary.

Thomas E. Clark, who embezzled $7,700 from the Chicago, Santa Fe & California, pleaded guilty at Chicago, April 30, and was sentenced to 2½ years' imprisonment.

Labor Organizations on the Reading.

General Manager McLeod of the Philadelphia & Reading has issued a notice to his employés to the effect that they will not be permitted to attempt to "use undue or improper influence with our men for the purpose of securing members for labor organizations." He says: "After the strike of last winter it was found that many employés who desired to remain independent had been compelled to join labor organizations in order to protect themselves from ill-treatment and possible loss of situations. We will discharge every man in the employ of this company who is guilty of such action hereafter Our experience with labor organizations during the last twelve months has not been of such a character as leads us to look with favor upon members of them, as against good men who prefer to remain independent."

Revoking a Railroad Charter in Nebraska.

The strangely hostile attitude of the authorities of Nebraska toward railroad interests in that state has been encouraged by a remarkable and important decision just rendered by the state Supreme Court. The Attorney General recently brought suit against the Atchison & Nebraska railroad Co., whose line now forms part of the Burlington & Missouri River, to annul the lease of the former to the latter company and to declare the charter of the Atchison & Nebraska void, on the claim that the practical consolidation of the two roads was in violation of the state constitution. The Court grants the demand, holding that the constitutional clause prohibiting the consolidation of parallel and competing lines of railroad is an absolute prohibition against a railroad corporation consolidating its stock, property, franchises or earnings in whole or in part with that of any other railroad corporation owning a parallel or competing line. The convention which framed the constitution, the Court says, aimed at practical results. The law cannot be evaded by substituting a lease for a deed of conveyance. That the two lines in question were competing lines is alleged in the information, admitted in the demurrer, and shown from the record. The lease is, therefore, clearly within the inhibition of the constitution. The Court also holds that the equities of the case are against the leasing of the line to the Burlington & Missouri, for the reason that the bonds voted to the Atchison & Nebraska by the people of the counties along its line were given for the express purpose of securing a competing line of road, and it is held that the consideration failed when the line ceased to be a competing line and was consolidated with its principal competitor—the implication apparently being that the bonds issued have ceased to be binding. The Court overrules the demurrers of the company and gives leave to file an answer by July 3.

It is difficult to see what is to be gained by this action. * * To compel the separate operation of this road will be a distinct disadvantage to the public and no advantage to any one. * *—*Railway Age.*

The Lake Superior Ore Trade.

The prices to be paid by furnacemen and the lake freights to be paid by ore shippers are still unsettled. The furnacemen are holding off for a concession of more than one dollar a ton, and the shippers do not feel satisfied with the views of the vesselmen. With the present price of pig-iron the smelters must have cheaper ores or lose money, as the reduction in prices of pig-irons, since January last, at Pittsburgh, has been from $2 to $2.75, depending on the brand. Shipments of ore have already commenced from Escanaba and it is expected that that port will be open several days sooner than the Lake Superior ports. It is said that both the Vermillion and Gogebic companies will try to compete with imported ores on the seaboard, in which effort they will be materially assisted by the increase in ocean freights. And the large ore docks building by the Lehigh Valley Railroad Company at Erie and Buffalo are thought to be in furtherance of this plan. The importations of foreign ores have been for 1886, 1,039,433; and for 1887, 1,194,301 tons, while the shipments from the Lake Superior region were 3,493,186 and 4,398,857 for the same years. Low prices for the ores and cheaper transportation would save to the country a large part of the money which would otherwise be paid to foreigners. A decrease in the output of the Lake Superior district is expected, but the Vermillion district proposes to increase its shipments over last year's by about 150,000 tons, bringing the aggregate up to 550,000 tons.

Justice in Alabama.

A Birmingham correspondent sends the following true story of railroad travel in Alabama, which, however, he insists is not characteristic. A boy in the rear end of a car was heard yelling lustily. On inquiry it was found that he, while his head was out of the window, had been hit by a stone thrown by a boy in a cotton field. When the conductor heard of the outrage he backed the train several miles to the cotton field, where the offending lad was seen wondering why the train was returning. When he saw a dozen or more men tumble out he took in the situation and took to his heels. The passengers and train men chased him a mile or two till he came to a stream, into which he jumped and swam across, leaving the avengers to return at their leisure to their train. The mail was late that day throughout several counties, and the boy in the cotton field had more fun than he had expected.

Heavy Rails in France.

A German exchange states that the Northern Railroad of France will lay heavier rails. The present weight is 61 lbs. per yard (30.2 kilos per metre), and the new rails will weigh about 87 lbs. (43.5 kilos per metre). It is said that the new rails will be made by French mills.

Lighterage Station for the Illinois Central.

A dispatch of May 8 says that it is announced that before the close of navigation this season the foundation for a great lightering station and general warehouse will be laid at the mouth of the Chicago River, on land controlled by the Illinois Central. The cost will approximate two million dollars, which will be furnished by the railroad company to a Chicago Buffalo syndicate that is to have the management of the enterprise, upon the payment of a stipulated low rate of interest on the money invested. This lightering will enable the largest steamers to enter the river with the bulk of their cargo, and the warehouse scheme will aid the Illinois Central to secure business which otherwise might find an outlet over other roads.

A Signal Romance.

An exchange gives the following account of a method of working signals which is intended to revolutionize the present railroad system. A cord protected by a wooden box runs the entire length of the track, and is connected with semaphores placed at half-mile intervals on either side of the road. The cord runs under bridges and culverts, and is connected with all switches diverging from the main track. Should any of the multitude of accidents to the track occur that are the cause of train wrecks the arm of the semaphore (which can be attached to the ordinary telegraph poles) is immediately placed at right angles with the post. At the same time an electric bell rings at the depots on each side of the accident, warning the agents that the track is out of order. For further safety an arrangement is attached to each engine, so that if the accident occurs after the train has pulled out, due warning will be given. Two arms extend from the cab of the engine, and when the semaphore is out, indicating danger, these arms would be struck and a bell would ring in the engine, giving notice of the impending danger to the engineer. The striking of one of the arms, also, by connecting wires, cuts off the steam and applies the air-brakes, thus bringing the train to a standstill. If workmen are employed on the track, instead of sending out flagmen to watch approaching trains, all that is necessary is to put out the semaphores on each side of where the work is going on. The inventor states that the system has been tested by the Grand Trunk Railroad of Canada during the past four months, and has given entire satisfaction. The total cost of fitting up an overland road with this system is estimated to be about $1,400 for 1,000 miles, and he says that the savings in the first six months, consequent on the decrease of wrecks, would amply compensate any company for its expenditure. There are several astonishing features in this announcement, but the most astonishing is the statement that it has been tried four months and found satisfactory.

Y. M. C. A.

The State Executive Committee of the Young Men's Christian Association of Alabama has decided to establish in Birmingham a railroad branch of the Y. M. C. A There are 2,000 railroad men in Birmingham. Mr. H. F. Williams, Railroad Secretary of the International Committee, and Mr. C. L. Gater, State Secretary of the Y. M. C. A., have the matter in charge. Quite a number of Birmingham railroad men are interested, and there is every indication of the successful carrying out of the project.

Meeting of Railroad Conductors.

The Grand Division of the Order of Railway Conductors held a meeting in Toronto, May 9.

Grand Secretary and Treasurer Dinckler in his report said, with reference to the Chicago, Burlington & Quincy strikes: "The industries of a large portion of the United States have been paralyzed by the efforts of one of the most selfish monopolies in the country to procure for itself still further benefits, regardless of injuries to others and particularly to other classes of railway employés."

American Association for the Advancement of Science.

Cleveland is preparing for the presence of nearly 2,000 leading scientists of the country, who will convene in that city Aug. 14, to attend the annual meeting of the American Association for the Advancement of Science.

TECHNICAL.

Uniformity of Parts of Cars.

The following circular of inquiry is issued by the Committee on Uniformity of the Interchangeable Parts of Cars of the M. C. B. Association: Up to the present time the Master Car-Builders' Association has adopted the following standards: 1. Wheel tread and flange. 2. Diameters of chill molds. 3. Distance between the backs of wheel flanges. 4. Axle. 5. Journal bearing. 6. Journal box. 7. Pedestal. 8. Gauges for wheels and axles. 9. Gauge for guard rails. 10. Brake shoes. 11. Screw threads. 12. Height of draw-bars. 13. Attachments of draw-bars. 14. Dimensions of dead blocks. 15. Attachments for the safety of trainmen. 16. System of marking cars. 17. Type of automatic coupler.

There is, unfortunately, a tendency, which seems to be inherent in human nature, to depart from established standards of mechanical as well as moral rectitude. In many cases, when parties have nominally adopted the standards of the association, they have knowingly or unknowingly departed from them to a greater or less degree. In some cases this has been due to ambition to improve on the action of the association, and in other cases to ignorance or misapprehension of what the standards really are.

Your committee has been appointed to consider the question, "How can uniformity in the interchangeable parts of cars be obtained?" and to make a report thereon at the next convention of the association. They therefore request members to reply to the following inquiries and to make any suggestions which will assist the committee in reporting on the subject.

1. How can railroad companies secure uniformity to the Master Car-Builders' standard in the shape of tread and flange, and the diameters of wheels which they make or buy?

2. How can master car-builders secure uniformity in the distance between the backs of flanges of their own wheels and those which pass over their lines?

3. Are the gauges recommended by the Master Car-Builders' Association for the maintenance of uniformity in wheels and axles the best that can be devised? If not, what kind of gauges would you recommend?

4. How can journal bearings, journal boxes and pedestals be made interchangeable and kept so?

5. How can brake shoes be made interchangeable and kept so?

6. How can the screws of bolts and nuts be made interchangeable and kept so?

7. In your opinion is it desirable for the Master Car-Builders' Association to adopt uniform non-automatic draw gear, and if so, should the present standard height of draw-bar and dimensions of dead blocks be adhered to?

8. In the adoption of the Master Car-Builders' standard type of automatic coupler, what steps should be taken to secure uniformity and interchangeability in draw gear of that kind?

9. Besides those already adopted by the Master Car-Builders' Association, what other parts of cars should be standardized by the association.

As the time before the next meeting is short, members are requested to answer the above questions promptly.

SAMUEL IRVIN,
HARVEY MIDDLETON, } Committee.
JOHN HODGE,

Replies should be sent to Samuel Irvin, M. C. B., Missouri Pacific Railway, St. Louis, Mo.

The Douglass Locomotive.

The recent test at Birmingham, Ala., of the Douglass patent small locomotive proved to be an entire success, and the East Birmingham Iron Works are now building about twenty of these engines. Ten of them were ordered by the Cahaba Coal, Iron & Railroad Co., and the remainder are being built for various firms in the South. Five are now in service at the Central Wharf, Pensacola, Florida.

The American Institute of Electrical Engineers.

The annual meeting of the Institute will be held, as required by the rules, on Tuesday, May 15, for the election of officers and the transaction of business. This meeting will be followed by a session on the 16th, when various interesting papers will be read and discussed. Among those now on the programme are: "Some Old and New Applications of Alternating Currents," by Lieut. F. Jarvis Patten, U. S. A.; "On Compensated Resistance Standards" and "On Professor Moler's 'Swinging Arm' Galvanometer," by Professor Edward L. Nichols, of Cornell University; "Subterranean Electrical Systems," by Professor George W. Plympton, Chairman of the Brooklyn Subway Board; and on "The Possibilities and Limitations of Chemical Generators of Electricity," by Francis B. Crocker. The meeting will be held at the House of the American Society of Civil Engineers, 127 East Twenty-third street.

Single vs. Coupled Locomotives.

Referring at length to this subject, the London *Engineer* remarks: The tendency in the present day is to run at higher and higher speeds, but it is certain that the limit has been reached in this direction, and that something very novel in railways will be needed if any marked advance is made. There is no reason, however, to think that the limit has been nearly reached in the weight of trains, and engines of augmented power are built to haul these trains at maximum speeds. The power of an engine is, however, mainly determined by the size of the grate, and it is a very difficult thing to get in a grate of sufficient size while the engine is coupled behind. It is true that Mr. Stroudley has shown that an engine may be coupled before, but his example has not been followed, and taking things as we find them the difficulty exists. It is not safe to use a coupling-rod more than 9 ft. long, and with an inside cylinder engine this means 7 ft. as the maximum length of the grate, and an area of less than 20 sq. ft. When the trailing-wheel is small the grate can be carried over the axle, but when it is large the practice entails well-known disadvantages and troubles. With single drivers a grate of almost any dimensions may be used, and this is perhaps one of the reasons why such engines are now in favor; but the principal reason is, no doubt, that steel rails and tires and the same blast render it possible to get all the adhesion really needed without resorting to coupling.

Locomotive Building at Paterson.

"The locomotive production at the three local establishments in April," says the Paterson (N. J.) *Guardian*, "was lighter than in any other month for some time past, with the exception of February, wherein the same number of engines, 28, were completed and shipped. The April product included thirteen from the Rogers works, several of which were for the Denver, Texas & Fort Worth road, and three for the West Shore; nine from the Cook works, nearly all of them for the Lackawanna road, and six from the Grant works for the Chicago, Milwaukee & St. Paul road. Thirty-nine engines were shipped in March, 28 in February, 33 in January and 43 in December last."

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections appointments, and especially annual reports, some notic of all of which will be published.*

Advertisements—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

A through line between Kansas City, Mo., and Savannah, Ga., is said to be the subject of negotiations between the Kansas City, Fort Scott & Memphis and the Central of Georgia, the extension of the latter to Birmingham, Ala., where it will connect with the former, being nearly completed. Such a line would be about 1,175 miles long and with the bridge which is proposed at Memphis would have the elements of a good line. We have not at hand the profile of either road, but presume that there are a good many saw-teeth in both. Savannah is a good port, but the exportation of Kansas corn from there to Europe will depend a good deal upon getting loads for the vessels on their westbound trips. The competition of New Orleans will enter very seriously also into the question of building up a great through business on the new route.

The New York Railroad Club proposes to discuss at its next meeting the link and pin and vertical plane types of automatic couplers for freight cars. This question as regards the country at large has been settled, and the vertical plane type has been chosen by a large majority of votes, and the publication of the lines now enables any railroad to equip its cars with the standard coupler. Doubtless the New York Railroad Club does not intend to re-open an old issue and re-discuss a question settled after very full investigation. Many roads in the East, however, still appear unwilling to abandon the link and pin type, and the meeting will be useful if gentlemen representing the mechanical department of Eastern roads are shown convincing reasons why the vertical plane type should at least be given a practical trial. Much of the unwillingness to favor the vertical plane type doubtless arises from the fact that this style of coupler is little known in the East and has not been so extensively used as in the West. Actual practical experience is generally more convincing than argument, and may possibly prove so in this instance.

The terrible killing of eight persons by an explosion of a neighboring powder car while they were peacefully sleeping in their homes at the dead of night, which is recorded in another column, is a startling illustration of the tremendous risks incident to railroad transportation. In pecuniary consequence this case is no worse, perhaps, than several other train accidents in recent months, of a somewhat similar character, notably those wherein a derailment or collision has set fire to a car of oil, and thus entailed an enormous loss from a small cause. Inflammable and explosive goods have heretofore been the object of much special care in transportation, but the increasing familiarity with these kinds of freight, may, perhaps, lead to relaxation of vigilance. The responsibility for the break-in-two on the Reading is not discoverable from the published accounts, but there was apparently a neglect of simple precautions. It is not easy to prescribe inflexible rules for the transportation of explosives. The longer the train the further from the dangerous car can the men ride; the shorter the trains, the more of them, and the greater the liability to rear collisions. If the goods are divided into small shipments there is an obvious temptation to relaxation of vigilance, and a larger number of persons are exposed to the risk. But in spite of these considerations it would seem to be well to reduce the number of couplings to a good deal less than 75 in such a dangerous train, and a chief lesson of this as of all breaks in trains is the necessity of hastening the adoption of strong (and automatic) couplers and automatic power brakes. With common couplings it is obvious that any one appreciating the risk would have been specially careful in inspection of the links and in the handling of the train over summits. The stopping of the forward portion of the train at the foot of a grade in such a case would be justified only in the face of *positive* danger ahead. Many a rear collision results from the engineer's lack of boldness to pull ahead in spite of rules. Of course no definite instructions can be given men on this point, but runners must take responsibility in extraordinary emergencies.

The report of the Massachusetts Commissioners on the Bradford accident, which is now made public, is a good example of careful investigation, and will be read with the attention which it deserves. It is fortunately true that so many elements of danger are very seldom concentrated in one place as were gathered at the southerly end of the bridge near Bradford. A bridge was approached on a curve, and the curve was entered by the train running down grade. On the outside of the curve a stub switch led off to a branch, and water tanks were placed on the outside of the curve between the switch and the bridge. The inside guard rails were curved together, but the points did not meet, and were in no way protected. The guard timbers were not gained down on the ties, nor were there spacing blocks or any means of keeping the ties apart, other than bolts through the guard timbers. Fortunately, however, the bridge stood up under the shock of a car against the end post, and the derailed car which entered the bridge stopped before the floor was broken. The only loss of life resulted from the wreck of one of the tanks, and, as it happens, it cannot be known now what caused the fatal breakage of the wheel, but the conclusions and recommendations of the Commission as regards the arrangement of track and structures, and the precautions to be taken, are quite justified by what actually happened.

The refusal of the officers of the Lake Shore & Michigan Southern to give free transportation to stockholders on their way to the annual meeting at Cleveland last week furnishes an exciting topic for discussion in local circles along the line of that road. The Inter-state Commerce law, which has been the cause of much mourning among pass-seekers during the past year, is said to be the reason for this action.

This is a sort of discrimination which it is safe to say no Congress or legislature would ever pass a law against. The injustice practiced on the holder of 10,000 shares when the possessor of a single share is placed on a financial equality with him has never appealed very powerfully to the feelings of the average legislative defender of the oppressed. This privilege is enthusiastically cherished by many a stockholder, and action like that of the Lake Shore's officers would in many quarters cause a storm of indignation which no president or general manager could withstand unless he were skilled in both public and domestic diplomacy. The stock of the Boston & Albany is said to be divided up into a great number of small holdings, most of the well-to-do farmers along the line having transferred a share apiece to their wives, daughters, sisters, cousins and aunts. This insures a general pilgrimage to Boston on the day of the annual meeting, though the meeting hall is not so overcrowded as are the dry-goods and millinery stores on that day. The stories told by the local papers are amusing. One town, 100 miles from Boston, has so large a representation that the prayer meeting of the orthodox church there is omitted if the annual meeting of the road occurs on a Thursday. Two women residing 50 miles from Boston went to that city on the occasion of a meeting which happened to be adjourned for two weeks. While trying on their new sealskin sacques in a Washington street store they heard of this fact, and at once resolved that their return trip, which their stock certificates entitled them to, regardless of distance, should extend to Albany, four times as far as their own home. Their friends in Albany received a little longer visit than ever before, but the end justified the means, and when the adjourned meeting came around these dutiful stockholders made their second pilgrimage to Boston, serene in the satisfaction that for once at least they had secured a tolerably satisfactory dividend on their shares. Of course, no one seriously argues that the transportation of stockholders to a meeting has any ground in right or equity. Generally, somewhere near a half (or more) of the stock of a road is held by a very few individuals. If they vote to place small holders on an equality with themselves, it is simply a sop to sentiment or prejudice. A ride worth $5 given to the holder of a $100 share is a dividend of 5 per cent. To the holder of ten shares it is only ½ per cent., and of 100 shares infinitesimal. If the passenger simply makes a trip for personal business or pleasure, the gift is absolute from the whole body of stockholders to him. If he attends the meeting in good faith he perhaps ought to be paid his expenses, including fare, out of the treasury of the company, though his relations to larger or smaller stockholders would still be inequitable. The only fair and practicable rule would be for each stockholder to pay his own way, whatever the Interstate law might say.

Workingmen's Trains.

Of all the experiments in railroad economy few are better worth watching than that of workingmen's trains. Not so much for its present success as for its future possibilities. To the public it offers the chance of a solution of some of the most serious problems of overcrowding in cities. To the railroads it presents at least the possibility of a new form of traffic even more wide reaching in its effects than the system of commutation tickets which has long since become a recognized element of railroad business.

Workmen's trains have been tried to some extent in Germany (especially in Saxony), in Belgium and in Austria. There have been a few instances also in England. In Massachusetts the system has been nominally introduced on three or four roads, but can hardly be said to have had a fair trial. The rates amounted to nearly a cent a mile, which was too high to bring the matter to an actual test. The success or failure of the several trains about Boston hardly touches the general question.

We may divide the experiments into two classes, one involving a general system of short time commutation for workingmen, the other involving special trains at special rates.

Of the first class, Belgium offers the most complete example. It is hard to find when the system started; apparently not earlier than 1871, and perhaps considerably later. The existing regulations are as follows: The workman must prove by proper documents that he is a workman. He must travel third class, usually by certain designated trains—sometimes, though not generally, organized for this particular service. The subscription is weekly, entitling the workman to one journey in each direction for six successive working days. The ticket is, of course, non-transferable. The rates for certain distances, which we select from a more detailed tariff, are as follows:

Distance. Miles.	Weekly subscription (twelve journeys). Cents.	Rate. Cents per mile.
3	20	0.56
6	26	0.36
10	34	0.28
20	40	0.17
30	46	0.13
40	52	0.11

It is, unfortunately, not easy to find exactly how much use is made of these tickets. The rates are so astonishingly low that the result would be interesting.

The Prussian system is less complicated than the Belgian, and, on the whole, it seems to us not so good. It is based on a scheme of equal mileage rates, which, of course, does injustice to somebody. The Prussian (and other North German) trains quite frequently have fourth-class cars, at rates of 2 pfennigs a kilometre, or about 0.8 cents per mile—half the third-class rates. These cars are intended for workmen traveling short distances, having no seats, and the fourth class ticket gives the holder no right to check any baggage. Besides this regular rate, there is a special system of weekly commutation tickets, fourth-class, good only on certain designated trains, at two-thirds the ordinary fourth-class rates, or a shade over half a cent a mile—considerably higher than the Belgian rates.

In the attempt to establish special workmen's trains, England seems to have taken the lead. Railroads which proposed extending into crowded cities and demolishing workingmen's houses, were compelled by Parliament to afford these men cheap facilities for getting to and from their work. Consequently for many years there have been instances of short distance trains which conveyed passengers for a penny for the journey. The results seem to have been fairly satis-

factory, but the practice has not extended, because the railroads consider such low rates unremunerative except in special instances.

Fifteen years ago, at the suggestion of the Massachusetts Commissioners, the system of workingmen's trains was introduced into that state. The Eastern railroad was the one which first tried the experiment, and under the most favorable circumstances. The train ran by the Saugus branch from Lynn to Boston, a distance of 13 miles. Tickets were sold at the rate of 20 for a dollar, or 0.38 cent per mile for those who rode the whole distance. In the second and third years of its operation, the receipts from this train went up as high as $1.70 per train mile. In the fourth year, the rates were considerably raised; and at the same time there was a falling off of nearly 20 per cent. in the receipts. There were some other causes which contributed to this result; but the fact itself is quite significant.

A similar train on the Old Colony was decidedly unsuccessful. On the Boston & Maine and the Fitchburg certain cars were devoted to workingmen rather than whole trains. Before these last-named experiments had had a thorough trial, Mr. Adams retired from the board; and since his departure the matter has dropped from public attention.

Rather recently it has been taken up in more systematic fashion in the neighborhood of certain European cities. The Saxon experiments are particularly noticeable. The beginning was a small one. In December, 1883, the city council of Gera, believing it of the utmost importance that the crowding of the poor should be relieved, offered the railroad authorities a sort of guarantee which would protect them from loss in case they would run a workingmen's train. The offer was accepted. Subscription tickets for a distance of somewhat over six miles were offered at 29 cents a week, or about $\frac{2}{3}$ of one cent per mile. The result was highly satisfactory. Instead of an average train load of 200 (the original estimate) the number soon rose to 300, giving gross receipts of $1.20 per train mile. What the Saxon railroad authorities had undertaken at Gera only on the suggestion and guarantee of the city council, they now extended of their own accord to Dresden, and afterward to Leipsic and Chemnitz. There are now some six or eight lines on which a special service of this kind is in force. The distances are short; the average rates are not far from $\frac{2}{3}$ of a cent a mile. The financial results are not as good as those just described; but the railroad authorities believe that there is no loss and a great deal of indirect gain.

A peculiarity of these Saxon trains is that they, in some cases at least, run to the freight stations instead of the passenger stations. In this way they bring the workmen, as a rule, nearer to the factories, they avoid crowding the ordinary passenger traffic, and apparently leave the cars (which are without seats) available for at once taking up local parcels traffic for the day. The example of Saxony has been followed in some parts of Prussia and Austria.

That such a system can be productive of great public benefit, no one familiar with the evils of crowding in our large cities will be disposed to question. The good effects in this respect seem to have been decidedly felt in Saxony. The Factory Inspectors of that country, in their last report, speak of the good results as "already apparent," and say that "the railroads have proved a valuable ally in the struggle for tenement house reform."

A more doubtful question, and one of more practical interest to railroad men, is "can it be made to pay?"

The answer depends almost entirely upon the question whether the traffic secured by these trains is something additional to what the road would otherwise get. If these train loads represent an actual increase of traffic they can probably be made to pay; if they simply or chiefly represent traffic transferred from other trains they certainly can not.

The direct expense per passenger train-mile of this kind, independently of its share of the fixed charges, probably lies between the limits of 40 and 55 cents. Assuming 50 cents as a fair average, it follows that, at half a cent a mile, 100 passengers would pay expenses; while at a third of a cent, making allowance for the slightly increased expense of heavier loads, anything much above 150 passengers ought to accomplish the same result.

Now, the facts show that under favorable circumstances, at least this result may be expected. Some roads have done much better. The Austrian workmen's train in the neighborhood of Brünn has had an average load of over 500. In cases of this kind there is hardly any limit to the conceivable reduction. But we must bear in mind that this traffic, to be profitable, must be virtually new traffic. If it is simply taken from other trains it will be a loss instead of a gain. Any manager who tries the experiment must bear this in mind. New traffic at half a cent a mile may be good economy, when traffic which is not really new could not be handled with advantage at double that rate. The commutation business is a case in point. A great deal of it is done at half a cent a mile; yet it is paying business, because if it were not done at those rates it would be lost altogether, and with it would depart a great deal of incidental business, both freight and passenger, which flourishes on a line which offers advantages to commuters.

Workingmen's trains may readily furnish a parallel case. The whole affair is simply a scheme for furnishing commutation for shorter periods and more restricted hours. A workman cannot readily take advantage of the commutation system as arranged at present. Monthly commutation is offered on comparatively few lines. The workman perhaps finds it hard to get the fifteen dollars necessary for a quarter's ticket; or he fears that he may be thrown out of employment before the three months are over, so that his money will prove a total loss. Is it good policy for the railroad to discourage such a man from making a home on its line? Is it not rather the surest means of creating new traffic to encourage him to do so?

If it be objected that such traffic is less regular than the ordinary commutation business, we reply that it is in one sense more regular. The railroad knows by which trains it is likely to travel; it can, if it pleases, stipulate that it shall use only those trains, and can arrange them accordingly. And the traffic is capable of even wider expansion than the present commutation business. The rich are few, the poor are many. We have learned to apply in freight business the principle of making money from large traffic at low rates; it may be that we can extend the same principle to passengers far better than we have supposed. In the case of the Austrian train already alluded to as so successful we are told that it is used by one-fifth of the population of the suburb which it serves. When we consider what the effect of that must be not merely upon the railroad but upon the population which uses the railroad, we see enormous opportunities for making money and doing good at the same time.

How far the system would prove practicable in this country, we cannot say; but we believe most distinctly in shortening the times of commutation, and making every effort to adapt the train service to the needs of those who use it in this way.

Steel-tired and Chilled Wheels.

The report of the Massachusetts Railroad Commissioners on the Haverhill accident contains many valuable facts and figures as to the relative merits and safety of steel-tired and chilled car wheels in passenger service. The testimony is conflicting, of course, and the opinions and experience of the eminent officers who use chilled wheels with such good results certainly carry great weight. It must not be forgotten, however, that they are speaking of chilled wheels made and accepted under rigorous specifications and tests. Mr. Barr, the most decided advocate of chilled wheels, amongst those whose opinions are quoted, says that nine-tenths of the wheels now made would not pass proper requirements. Therefore, taking wheels as generally made, the conclusion of the Board is properly in favor of steel-tired wheels, and it is significant that the Boston & Maine, the road on which a broken flange of a chilled wheel caused such a serious loss of life, is replacing chilled wheels with the Snow steel-tired wheel at the rate of 50 per month.

The process of replacing chilled wheels in passenger service with a safer though possibly more expensive wheel is evidently fast progressing in New England. It appears that taking the railroads of Massachusetts and omitting the Housatonic and New London Northern, which do not return the number of chilled wheels in use, that there are in that state no less than 6,104 steel-tired wheels in use in passenger service against 10,496 chilled wheels, and further that the latter have been entirely replaced on one road, the Boston & Albany, and are being replaced on several other large lines, while only one small road reports any complaint against steel-tired wheels.

Mr. Barr, of the Chicago, Milwaukee & St. Paul, argues in favor of chilled wheels, but his unfavorable opinion of steel-tired wheels appears to be derived wholly from experience with wheels in which the tire has an internal flange or rib, for he speaks of "the inside projection by which the wheels are always bolted." The disadvantages of this method have been fully explained in these columns, and the effect of bolt holes near the edge of a flange in weakening the tire and causing fracture when the tire is worn down were shown from the experience of a well-known road.* Steel is especially liable to be broken by "nicking," and this is well understood in rails, where it is generally known that punching or even drilling the flange for bolts or spikes simply invites fracture, and though the effect on tires is not so marked, it is recognized in many quarters, and some secure fastening where the section of the tire is unimpaired has been found by experience to be the best. And yet it is true that tires with the internal flange have given and continue to give excellent service. What we contend for, however, is the wheel which will give the maximum of safety.

It is undoubtedly true, as argued by Mr. Barr, that a chilled wheel has three very essential qualities to a good wheel, a hard tread, a soft and somewhat elastic interior or body, and no parts to shake loose. Unfortunately solid wheels, whether of iron or steel, suffer from an inherent disadvantage. Should a flaw develop in the tread, there is nothing to prevent it extending to the body, while a flaw in the hub or body is equally certain to spread to the tread, in either case causing disastrous wreck. A steel-tired wheel with a good tire fastening is completely free from this danger. Should the tire break, the fastening holds it securely to the body of the wheel, and should the body show a fracture, which rarely occurs, the flaw cannot spread to the tire, which with the retaining rings hold the wheel safely together. All are familiar with the fact that many cast-iron driving-wheel centres, though cracked completely through the rim, are yet held securely in place by the steel tire, and the analogy holds good for car wheels.

The discussion as to the relative cost of steel-tired and chilled wheels reminds one of the animated discussion conducted by Zerah Colburn, in the columns of *Engineering*, as to the relative merits of steel and iron rails some 20 odd years ago. It was admitted that one steel rail would outwear some three or four iron rails, but the question of compound interest on the far more expensive steel rail was brought up as the conclusive argument for the iron rail. Zerah Colburn urged the superior merits of the more expensive material, and we all know that he proved to be right, and that the greater convenience and safety of the better article brought about a widespread demand, which in turn reduced the price and stimulated improvements in the manufacture until the point was reached where a steel rail could be more cheaply made than an iron rail. Any such diminution of relative price can hardly be anticipated as regards steel-tired wheels, but it is an undoubted fact that the tendency in railroad working is to employ more durable appliances in every department, and that experience shows that the inconvenience of constant repairs and renewals, though it cannot be exactly measured in dollars and cents, is a very serious interruption to the business of a railroad.

* See the *Railroad Gazette*, page 403, June 17, 1887.

Demurrage and the Per Diem System.

In another column will be found the rules under which the New York & New England is now collecting demurrage. The plan has been in effect a month, and we understand has thus far developed very little friction. This road has within the past few months cut off the greater share of its credits to customers, many who paid large freight bills a month or two behind time being brought down to a reasonable system of short credits, and others whose bills were small and allowed to run so long that the keeping of the account was burdensome being made to pay on delivery.

This action, which, like the collection of demurrage, would naturally offend many patrons and drive away some business, has not as yet shown any appreciable effect on the traffic, and the road has a fair prospect of showing that it has a very reasonable set of patrons. The pleasing of patrons would seem to be the only really difficult problem connected with either shortening credits or collecting demurrage. There is, indeed, a possibility that cutting off of credits might be deemed a necessary move in order to comply with the law against discrimination, if complaint were to be made. The assumption that the collection of demurrage is illegal, which has led many managers to give up all efforts to increase the efficiency of their cars in this way, would seem to be of questionable validity, to say the least. While the laws of some states may technically prohibit demurrage, such laws would probably not affect inter-state traffic, and they would be good ones to fight for the repeal of. Stor-

age certainly is legally collectible, and the difference between a rolling storehouse and a fixed one is not such as to warrant radical difference in treatment, except as to price; and self interest will compel railroads to see that that point does not thwart them.

The management of the New York & New England decided that demurrage must be adopted even if it should sacrifice some revenue, as the road had reached a point where an expenditure of $400,000 for new side tracks, new land for station yards, and new freight cars was imperatively necessary if the business was to continue under the old methods. It needs but very little *practical* calculation to prove the wastefulness of the common system of handling cars, and after only one month's trial this road has effected an economy in its switching service as decided as that lately reported from Omaha, though not so large.

The road's circular announcing its adoption of per diem car service states that the change is somewhat of an experiment, as, of course, would be understood; but in this case we may hope for a specially intelligent study of the results of the experiment, as Mr. W. P. Shinn, the Vice-President of the road, has investigated the subject thoroughly and takes a lively interest in it. Mr. Shinn, in a paper published in the *Railroad Gazette*, June 29, 1883, p. 423, strongly advocated a simple per diem system, and still believes that to be the true principle. The deterioration of cars results so largely from weather and from wear and tear in switching for which no mileage is charged, and which the car is subject to even when it is nominally standing still, that he believes the wear from actual travel can safely be averaged. The difference in the wear of two of his cars, one of which goes to Buffalo and the other to Omaha, is so little that he is willing to take pay for it by the day, notwithstanding that one car may travel 100 miles a day and the other 200.

Mr. Shinn, who in the paper referred to advocated taking into account the capacity of cars, charging twice as much for a 20-ton as for a 10-ton car, also believes in making the rate high enough to strongly stimulate prompt return. A moderate rate will not bring cars home in busy seasons when they are most wanted, and in dull seasons they will come home in spite of any system. Mr. Shinn's views clearly show the weak points in the mixed per diem and mileage system. Under that each road trusts to its neighbor's honor, as under the present system. Straight per diem, with a high rate, places the interchange of cars on a business basis. If the mixed plan is to be continued, and modifications in the rate per day attempted as a remedy for the inequalities which have led the Reading and New York Central to abandon the trial, there would seem to be no escape from a variable scale of rates, which would involve complexity in the accounts and constant bother. By using a fixed rate, high enough to afford the owner of the car a decided profit, the problem with borrowers will resolve itself into the question, which would press itself upon their attention, Why should I not at once have more cars of my own? And this would be a healthy state in which to leave it.

Superintendents and their Men.

A chief difficulty in describing the methods used by progressive superintendents and in telling of the results of their policy in the treatment of employés, as was attempted in our issue of April 20, is the characteristic reluctance of these officers to allow their names to be used. We recognize that what we said in that article must, in the nature of the case, suffer a marked lack of force from the absence of figures, localities and dates. Nevertheless the facts are important, and their bearing can be discerned by those who choose to consider them, in spite of this drawback.

In the article referred to we gave some account of the results of an especially intelligent effort at improved discipline among a few hundred railroad employés. We pointed out the fact that the superintendent referred to was a "leader of men" (such as Professor Hadley says railroads must have) and that he had the benefit of long acquaintance with his road; this we did because these facts are significant. Many roads have men fit leaders and also have officers acquainted with the road, but they do not combine the two excellences in one person. This superintendent has the courage to be frank, which is no small merit, and he makes his subordinate officers "get there" or step down. He takes green men for brakemen, believing it to be better to educate his own men, even if he educates for other roads, than to let other roads train men for him. He inspects his force so closely as to know *very fully* what the men are doing day by day; he rewards special merit and requires a high standard of efficiency from all. These, briefly, are the levers that have materially elevated the morale of this force.

The general superintendent of a larger line, one where a single head cannot possibly deal directly with even one quarter of his men, in commenting on the methods in vogue on this smaller road, said that the only difference between these plans and his own was simply a lifting up. The superintendent who has for a term of years dealt directly with his conductors, engine men and station agents, and become familiar with their ways and learned to deal with them with patience, and without wasting time, must, when he finds himself forced to a higher place by the enlargement of the affairs under him, endeavor to put in his old position a new man just as good as himself; or, at all events, one who has as large a mind for details and as large a heart with which to discern the human side in dealing with men. The idea that the ability can be wholly or even largely confined to the general superintendent, leaving the division superintendents to be not much more than clerks is irrational. One of the most important points in management is to have the men understand the chief manager's spirit as well as his outward and visible acts. The general officer must have time to not only tell his division officers what to do, but to talk with them familiarly, giving them an insight into the reasons for action, and at the same time the reasons for not acting in the opposite direction. The division men must take time to repeat this to the next grade below. One superintendent brought about a great change in the attitude of his engineemen by imparting his own spirit to the officer in immediate charge of the runners, who in turn conveyed the knowledge of the same to them. Harmonious relations with equals—superintendents of other roads, for instance—are maintained often only by patient and long continued negotiation and conciliation. Employés should be treated more like equals, at least so far as to recognize that they like to know the reason *why* a certain thing is done as well as a superintendent does. The plan adopted by the Erie in the instruction of its dispatchers on the new train rules deserves adoption in other departments. The dispatchers were given the views of the management (*i. e.* the new rules) and then invited to give their own views. They were given time for this, and then were accorded explanations of the differences that they brought up. The result was that they adopted changes cheerfully and intelligently. Take the extreme case of a sudden reduction of wages. If the general manager says stern financial necessity demands it, and the men believe him to be an honest man, they will be much more likely to cheerfully acquiesce than if he be a man whom they believe to be looking out chiefly for his own personal standing with the directors as an economist. Instead of briefly saying that "falling off in business demands retrenchment," explain more at length, giving figures and comparisons. This kind of courtesy would pay as well as suavity in the office. Some employés may be kept from making trouble by being invited to sit in plush arm-chairs when they call at headquarters, or being urged to go personally to the president of the road with little demands or grievances (when it is known that they will receive no more real satisfaction there than from the inferior officer). Others would be better pleased by an exhibit of the actual condition of the road and its prospects. Are conductors, engineers and agents unappreciative of these considerations? Try them and see.

The gist, then, of what we learn from general superintendents who have not been so absorbed in purchasing supplies or keeping track of lawsuits, but that they could keep acquainted with the status of their own working force, is, that their plans and those of the managers of smaller roads need not be essentially different. If men can be kept contented on a small road they can on a large one. The important fact to be remembered is the difficulty of doing anything by proxy, and the necessity of making provision against these difficulties. It is admitted that the overseer of a hundred men can keep them from unreasonable behavior with comparative ease; if the overseer has ten thousand men his problem is to get 100 lieutenants who will *fully* represent himself.

Annual Reports.

Kansas City, Fort Scott & Gulf.—The general results are as follows:

	1887.	1886.
Gross earnings	$2,732,203	$2,539,338
Operating expenses	1,661,171	1,475,527
Net earnings	1,071,032	1,063,811
Fixed charges	635,203	625,941
Balance available for dividends	435,829	437,870

This balance was sufficient to pay 8 per cent. on the preferred and 4½ on the common stock. It will create some surprise to see that this increase of ½ per cent. on the common stock was made in the face of a slight reduction in the amount available for the purpose. Whether this was done in view of the consolidation with the connecting lines—then approaching, and now carried into effect—it is impossible to say. It seems likely that there was some such reason, for the traffic figures do not justify the increased dividend. We have little hesitation in saying that conservative methods of accounting would have converted the year's nominal surplus of $6,700 into a deficit. In spite of the increased traffic, the charges for maintenance of way were less in 1887 than in 1886; while the amount of additional property to be shown for the $109,000 expended on construction and equipment charged to capital account of main line seems rather small. It is also to be noted that the failure to increase net earnings with increased traffic was not simply due to reductions in rates, as was the case on so many other lines; but that, for some reason or other, the traffic of 1887 was not handled with as good economy as that of 1886. For instance: with an increase of 14 per cent. in tonnage and nearly 20 per cent. in ton mileage, there was a slight decrease in train-loads, and a decrease in receipts per freight-train mile from $1.88 in 1886 to $1.66 in 1887. What makes the loss all the more significant is that the report tries to conceal the fact—giving the comparative figures with regard to passenger traffic where the decrease per train mile was but slight, and omitting them with regard to freight where it was serious.

Philadelphia Co.—The fourth annual report of this natural gas company recites continued growth and prosperity. The year ended March 31, 1888. The gross earnings were $1,901,704; the expenses $887,061, or 46.65 per cent. of the earnings. Dividends of 1 per cent. per month were paid, to the amount of $842,627, leaving an undistributed surplus of $172,016. During the year the remaining capital stock was sold and the entire authorized stock of $7,500,000 is now issued. The assets were $9,668,189, against which there are liabilities as follows:

Capital stock paid in	$7,500,000
Bills and accounts payable	1,176,158
Undivided earnings	992,032
	$9,668,190

The indebtedness decreased nearly half a million in the year, and the cost of all the new wells for the increase and maintenance of production, and for exploration, was charged to operating expenses. The whole number of "contracts" now supplied by the company is 23,707, of which 796 are for the supply of manufactories and 22,916 for dwellings. The miles of pipe lines operated by the company are 654.17. Of this 2.2 miles are 30 in., 195.97 miles 8 in., and 31.39 miles 2 in. and under. A great variety of intermediate sizes are used. The company operates 173 wells.

The officers of the company look forward to the time when they will have to supplement the supply of natural gas by manufacture, and have united with the Fuel Gas & Electric Engineering Co., Limited, of Pittsburgh, in experiments to secure the best results.

A great deal has been said within a few days about the rumored transfer to the Canadian Pacific of a controlling interest in the stock of the consolidated lines of the "Soo" system. So far as yet appears, certain individuals, some of whom are officials of the Canadian Pacific, have bought one-half the stock of the Minneapolis, St. Paul & Sault Ste. Marie. This consolidated system embraces the Minneapolis, Sault Ste. Marie & Atlantic and Minneapolis & Pacific, some 785 miles or more of completed road, extending in a pretty direct line across Northern Michigan, Wisconsin, Minnesota, and one-third of Dakota, connecting with all the great wheat carriers of the Northwest, and reaching at Minneapolis one of the greatest wheat centres of the world. The consolidation also includes the Aberdeen, Bismarck & Northwestern yet to be built. It is a matter of national interest to know how far the Canadian Pacific will be able to control the policy of this system, but with or without such control it is to be supposed that the business of the "Soo" system will come east over Canadian lines. The Minneapolis, Sault Ste. Marie & Atlantic has no other great reason for its existence. Its local traffic cannot be very great for years to come, and a connection with the Michigan Central at the Straits of Mackinaw, while a possible alternative, would be geographically illogical, to say the least. Once built, it was almost inevitable that it should work in connection with one or the other of the Canadian roads, and the Grand Trunk has not yet reached the Sault Ste. Marie. It is rather unnecessary, therefore, to speculate as to the effect of the control of the system by Canadian interests. Had the Northern Pacific or the Manitoba bought the stock the result would have been much the same, or very likely worse, so far as the division of traffic to Canadian lines goes. They could have thrown more business over the line to the Sault than can the present owners, and we have no reason to suppose that they would have refrained from making that line earn money, because the Canadian Pacific would also have been benefited. Possibly they would have been more ready to make a connection with the Michigan Central than the present owners will be.

The project for bridging the Detroit River at Detroit now takes the form of a proposition for a winter bridge. That is, the proposed bridge would consist of swing spans only, over navigable water, and would be permanently open during the season of navigation, the railroad business being carried across by ferry as at present while navigation is open. A charter has been obtained from the Dominion Parliament,

and strenuous efforts are making in Washington to get the necessary legislation. Vessel owners oppose the plan strongly on the grounds that the piers will seriously obstruct navigation, and that the present plan is but opening the way for a bridge to be operated in summer as well as winter. There is probably behind the opposition a motive not expressed, but actually stronger than the ostensible objection. That is, the desire to make life as hard for the railroads as it can be made.

We have announced before the letting of the contract for the bridge of the New York, Providence & Boston over the Thames at New London. The superstructure is to be of steel, double track, with five spans. The swing span will be 502 ft. long; the two spans flanking it will be each 310 ft., and there will be two shore spans, deck, each 150 ft. The total length, therefore, will be 1,422 ft. The clearance above high water will be 32 ft. The greatest depth of water is 57 ft., and of mud and penetrable clay, 80 ft. The contract for the whole structure has been taken by the Union Bridge Company, in connection with Alexander McGaw, for substructure and masonry. A. P. Boller is the Engineer.

Elsewhere we print the special report of the Massachusetts Railroad Commissioners to the State Senate on the subject of steam heating. It is based on the investigations made for the Board by Prof. Lanza, of the Massachusetts Institute of Technology. The report of the Commissioners indicates that Prof. Lanza's study of the subject shows that continuous heating is actually economical. This does not surprise us, although his paper before the last meeting of the New England Club does not show that he had reached such a conclusion. In that paper he said: "These experiments show that any one who takes the extreme ground in either way is mistaken: that to heat up passenger cars a certain amount of steam is required commensurate with the heating to be done, and it is neither an inappreciable amount nor a very excessive amount; and that as a rule it would not interfere with the running of the locomotive." There is, however, no intimation that he found that the cost of fuel, wages and maintenance was less with continuous than with independent heating. Prof. Lanza's report will be looked for with interest by railroad officers as well as by the owners of the various heating systems.

The addition of vestibules on through trains has proved so decided an improvement that this feature is being adopted on many routes. The new Atchison trains from Chicago to Kansas City have vestibules throughout, and similar cars have been ordered for the Burlington route, while the Chicago, Milwaukee & St. Paul will commence running vestibule trains between Chicago, Milwaukee, St. Paul and Minneapolis on May 15. The greater safety and convenience to passengers, and especially to ladies, in passing from one car to another are apparently the greatest recommendations of the vestibule, which will be especially popular in the winter, for it is somewhat trying to pass out of a warm car into the spark-laden blizzard on the platforms, with the handrails covered with ice and cinders.

The Chicago, Milwaukee & St. Paul has applied for the necessary writ of error for an appeal to the United States Court in the milk case lately decided against the road by the Supreme Court of the state of Minnesota. The State Commission, it will be remembered, fixed a tariff of charges for the transportation of milk, and the Court held that the authority given to the Commission to fix rates is not a delegation of legislative power, and that the company may be compelled by mandamus to accept the tariff fixed by the Commission. The company will appeal on the ground that the power given to the Commission to fix rates absolutely amounts to taking the property of the company without due process of law, and in violation of the 14th amendment to the Constitution. The state opposes the writ on the ground that the right of the state to regulate rates is no longer a subject of doubt.

Some weeks ago we published the statement that the Chilian Government was asking proposals for building 700 to 800 miles of railroad in that country. The Chilian Consul General, at 15 Cortlandt street, New York, will give information concerning the contracts, and information can also be obtained at the Legation in Washington, and at the Consulates in Boston and Philadelphia.

NEW PUBLICATIONS.

Report of the Proceedings of the Twenty-first Annual Convention of the Master Car-Builders' Association. This volume is of unusual size, containing 341 pages of text, a large number of plates, some of considerable size, and numerous elaborate tables. The most conspicuous feature is the report of the committee on freight train brakes, which contains in great detail the results obtained at the Burlington brake tests both in 1886 and 1887. The construction of the competing brakes, etc., is also very clearly shown.

The votes by letter ballot on the adoption of the Janney type of coupler as the standard of the association shows the principal railroads concerned to have voted as follows;

YES: Chicago, Milwaukee & St. Paul; New York, Lake Erie & Western; Baltimore & Ohio; Philadelphia & Reading; Chicago, Burlington & Quincy; Atchison, Topeka & Santa Fé; Lake Shore & Michigan Southern; Burlington & Missouri in Nebraska; Chicago & Northwestern; Northern Pacific; Pennsylvania Railroad; Chicago & Alton; Chicago, Rock Island & Pacific; Pittsburgh, Cincinnati & St. Louis; Southern Pacific; Pennsylvania Co.; New York, Chicago & St. Louis; Wabash Western; St. Louis & San Francisco; Burlington, Cedar Rapids & Northern; Chesapeake & Ohio; New York & New England; Wabash; Cincinnati, New Orleans & Texas Pacific; Chicago, St. Paul, Minn. & Omaha; Buffalo, N. Y. & Philadelphia; Richmond & Danville; Central of Georgia.

NO: Delaware & Hudson; New York Central; West Shore; Delaware, Lackawanna & Western; Illinois Central; Grand Trunk; Lehigh Valley; Central Vermont; Fitchburg; Old Colony; Boston & Albany; Rochester & Pittsburgh.

In all 474 votes were recorded in favor of the adoption of the Janney type as a standard, and only 194 votes were cast against the adoption. It will be seen from the above that the Michigan Central and a few other prominent roads did not vote, and that the objection to the vertical plane type was almost wholly confined to eastern roads. All the southern and western roads represented voted in favor of the vertical plane type of coupler.

The other proposed standards were not adopted, and the members of the Association were therefore unable to agree upon standards for non-automatic draw-gear rigging, axles, journals and wedges for 60,000-lb. cars, and sizes of lumber for car construction.

TECHNICAL.

Locomotive Building.

The Baldwin Locomotive Works have just shipped one locomotive each to the Bessemer (Ala.) Dummy Line and the East Lake Dummy Line, Birmingham, Ala.

Car Notes.

The Old Colony has just received the first consignment of a lot of 8 new 60-ft. standard passenger coaches from Osgood Bradley & Sons, Worcester; also 12 of the same design from the Wason Manufacturing Co., of Springfield. These cars have a very handsome appearance and are fitted with all the latest modern conveniences and improvements. A train consisting of a part of these cars will be used immediately on the newly acquired Providence Division for traffic between Boston and Providence.

The Janney coupler is being applied to 300 cars on the Pittsburgh, Fort Wayne & Chicago, at the Fort Wayne shops.

The Chicago, Burlington & Northern has contracted with the Ohio Falls Car Co., Jeffersonville, Ind., for the building of ten passenger cars.

The Haskell & Barker Co., of Michigan City, Ind., are building 1,250 cars for the Eastern Railroad of Minnesota.

The Louisville & Nashville has just received a number of new passenger cars, five of which have been put into service on the Alabama Division.

Work was commenced May 7 on the erection of the new rolling mill building at Anniston, Ala., for the United States Rolling Stock Co.

The Atchison, Topeka & Santa Fe has contracted with the Indianapolis Car & Manufacturing Co. for the building of 2,000 gondola cars of 60,000 lbs. capacity. The firm has just completed a contract for 1,800 box and 700 freight cars for the same road.

The Pittsburgh, Shenango & Lake Erie has contracted with the Erie Car Works for the building of 250 freight cars. A contract for the building of 200 additional cars is pending with a Detroit firm.

Bridge Notes.

The County Commissioners ask for proposals until May 24 for the construction of an iron bridge across Clay Creek at Valins Station, in Yankton County, Dak.

Proposals are wanted until May 15, for erecting three iron bridges at Franklin, Pa. Address William A. Maitland, County Commissioner.

The Elliott Bay Bridge & Pile Co. has been incorporated at Seattle, W. T., with a capital of $60,000 by Thomas A. Jones and others.

It is reported that the County Commissioners will place an iron bridge over the Concho River at San Angelo, Tex.

It is reported that the County Commissioners will erect several bridges in Monterey County, Cal.

An iron bridge is to be erected at Cuttingsville, Vt.

The County Commissioners are, it is reported, to build a bridge at Pocopson, Pa.

The following bids for the iron superstructure of ten bridges have been received by the County Commissioners, at Pittsburgh, Pa.: Pittsburgh Bridge Co., $11,400; J. M. Walker, $11,600, and Keystone Bridge Co., $12,508. The Pittsburgh Bridge Co. received the total award.

A bridge will be erected over Bear River by Nevada and Placer counties, Cal. Address W. D. Woods, Grass Valley.

The Berlin Bridge Co., of East Berlin, Conn., has been awarded the contract for the iron bridge over the Boston & Albany Railroad, near Pittsfield, Mass.

The New York Central & Hudson River will build an iron bridge at Leroy, N. Y., this summer, and it is stated that another will be built on the Attica branch about four miles south of Batavia, N. Y.

A new iron bridge will soon be erected at Akron, N. Y.

The Detroit Bridge Co. is erecting an 800-ft. iron bridge over the Wabash River at Terre Haute, Ind., for the St. Louis, Vandalia & Terre Haute.

A steel cantilever bridge over the Great Kanawha River, at Point Pleasant, W. Va., has just been completed for the Ohio River Railroad. The bridge has two shore spans of 240 ft. each, and a river span of 480 ft., together with 2,980 ft. of viaduct approaches.

The St. Augustine & Palatka has completed a 4,300-ft. trestle and a drawbridge over the St. Johns River. The total length of the draw-span is 230 ft., with clear openings of 100 ft.

The Shenandoah Valley has asked bids for erecting a four-span 160 ft. through-truss bridge, to replace a wooden bridge over the Shenandoah River, at Riverton, Va. Charles S. Churchill, Roanoke, Va., is engineer.

The Somerset Railroad will soon complete a bridge across the Carrabassett River at North Anson, Me. The bridge is about 400 ft. long.

The Louisville Bridge Co. will soon commence the erection of a 300-ft. bridge at Verbena, Ala.

The Missouri, Kansas & Texas bridge across the Colorado River at La Grange, Tex., 640 ft. long on tubular piers, has been completed.

The Wrought Iron Bridge Co., Canton, O., has been awarded the contract for the iron bridge over White River, near North Indianapolis, Ind. The contract price was $21,000.

The County Commissioners, Lincoln, Neb., have let the contract for the construction of two 60-ft. iron bridges to the King Iron Bridge & Manufacturing Co., Cleveland, O.

The Phœnix Bridge Co., of Philadelphia, Pa., will soon commence the erection of a bridge over New River near the mouth of the Upper Loup Creek for the Chesapeake & Ohio Railroad. The bridge has one span each of 200 ft., 250 ft. and 350 ft., and has a skew of 45°.

Manufacturing and Business.

The Betts Fencing Co., of Palmer, Mass., has received an order from the Boston & Albany for 15 miles of fencing.

The Wainwright Manufacturing Co. has established a western department at 10 South Canal St., Chicago, in charge of H. S. Walker.

The Sprague Electric Railway and Motor Co., of New York, is making arrangements for an electric road at Davenport, Iowa, to start with eight cars, each equipped with two motors. It will be about 3½ miles long.

The following bids for furnishing two separate pumping engines, of 36 and 48 in. stroke respectively, were opened April 9, at Allegheny, Pa.: Wilson, Snyder & Co., $42,000 and $45,000; the George F. Blake Manufacturing Co., $48,450 and $54,600; Henry R. Worthington, $58,600 and $42,200 on two patterns of 36 in. stroke and $46,000 for the 48 in.; the Gordon Maxwell Co., one bid on 36 in., $40,000; the Holly Manufacturing Co., Lockport, N. Y., three bids, all on 36 in., for $70,000, $38,000 and $36,000, the specifications describing the classes to account for the discrepancies. The bids were referred to the Machinery Committee.

Mr. A. M. Van Auken, late Division Engineer on the Denver & Rio Grande, has associated himself with Mr. C. W. Mead, a mining engineer, and established an office in Denver, Colorado, where they are prepared to examine and report on railroad and mining properties and make surveys.

The Standard Oil Co. is preparing to lay a pipe line for conveying petroleum from Lima, O., to Chicago, a distance of 208 miles, and of this total length the Pennsylvania Tube Works are making 75 miles, and the National Tube Works 49 miles. The remaining 93 miles is divided between the Oil City Tube Works, at Oil City, the American Tube Works, at Middletown, and the Reading Iron Works, at Reading. All these works are in Pennsylvania. The diameter of the pipe is 8 in., and each section is 22 ft. in length. The estimated cost of the line, without pumping machinery and tank reservoirs, is about $7,000 per mile.

The Scovel & Erwin Construction Co. has been incorporated in Birmingham, Ala., with Minor Scovel and A. M. Erwin, of Nashville, and Henry B. Tompkins, of Atlanta, as incorporators. The capital stock of the company is $10,000, and they will engage in railroad construction and general contracting.

The National Paint Works, Williamsport, Pa., report large foreign orders for their Asphaltum Paints. Shipments have lately been made to Panama, Guatemala, Spain and South America.

George Place, representing Messrs. Bement, Miles & Co., and J. A. Fay & Co., has removed to the Equitable Building, 120 Broadway, New York City.

Henry C. Adams has been appointed President of the American Electric Manufacturing Co. of New York, to succeed Edwards H. Goff, resigned.

Charles A. Schieren & Co., of New York, have opened a branch house at 46 South Canal street, Chicago, where they will carry a full line of their belting and other goods. Emil Gabel will have charge of this branch.

Iron and Steel.

The Cincinnati Forge & Iron Co. have completed the rebuilding of their works at Cincinnati, and have started them up on car axles and other forgings. They have appointed B. L. Keen & Co., 184 Lake street, Chicago, agents for the Northwest.

Carrie Furnace, at Rankin Station, Allegheny County, Pa., has been banked down on account of the employés refusing to accept a 10 per cent. reduction in wages. It is thought, however, that the trouble will soon be adjusted.

The Buckeye Foundry Co. has been incorporated at Cleveland, Ohio, with a capital of $100,000, by F. E. Drury, H. P. Crowell, and others.

A Philadelphia company, represented by Marion C. Smith and others, proposes to build a large steel works at Latrobe, Pa., with a capital stock of $600,000.

Last week the eighth of the large welding furnaces composing the lap-weld department of the National Tube Works Co. was put into operation. One more furnace makes up the mill, but it is being modeled for electric welding, and is virtually out of use. The furnaces have now an average daily output of 85 tons each.

The timbering of the new mine of the Oregon Iron & Steel Co.'s works at Oswego, Ore., has been commenced, and it is expected that the work of taking out ore will soon be begun. The pipe foundry is approaching completion.

Ground has been broken for the buildings of the iron and steel works at Superior, Wis., which, when completed, will cost $300,000, and will give employment to about 500 people.

The strike at the Edgar Thomson Steel-Works at Braddock, Pa., was declared off May 3. Rails were made in the new mill for the first time on the 2d inst.

The Chemical Steel Co. has been organized at Birmingham, Ala., with the following officers: R. M. Ulmford, President; S. T. Martin, Vice-President; J. B. Hill, General Manager; C. C. King, Secretary; Soule Redd, Treasurer; N. Smithson, Attorney; H. L. Underwood, Auditor. E. P. Epping, President of the Chattahoochee National Bank, of Columbus, Ga., and S. T. Barnett, President of the American National Bank, of Birmingham, Ala., and the officers named, constitute the board of directors. The capital stock of the company is $1,000,000, of which $25,000 has been paid in cash, and will be used to thoroughly test the process of steel making, the patents on which are owned by the company. It is the invention of Prof. N. Pratt, state geologist of Georgia, who has been working at it for a number of years. He forces a special chemical preparation into the blast furnace, which removes every trace of phosphorus from the iron, and carries it off with the slag. The product is Bessemer pig ready for the rolls. Prof. Pratt has secured patents on his discovery, and sold an interest to Messrs. King, Redd and Epping, of Columbus, Ga. Those gentlemen went to Birmingham, and soon got capitalists in that city interested.

The Rail Market.

Steel Rails.—The market is dull and weak, with sales of less than 15,000 tons. Eastern mills fairly well supplied up to July and August. Quotations: Standard sections at Eastern mill, $30.25@$31.

Old Rails.—A sale of 5,000 tons for delivery at Pittsburgh at private terms is reported. Other sales, aggregating about 3,000 tons, have been made at $20.50 in yard.

The New Trains on the Atchison Route.

The four trains on the Atchison, Topeka & Santa Fe's new Chicago line are said to be the finest and most luxurious yet seen in the West, embodying many improvements on the famous original vestibule train. Each train consists of one baggage car, a mail car, a second class coach, two first class coaches, composite or parlor smoking coach, one dining car and two sleeping coaches, or

nine vestibule coaches in each train. The cars were built by the Pullman Palace Car Co., and are lit with the electric light and heated with steam from the engine. The sleeping cars, 60 ft. long, are furnished in Louis XV. design, with mahogany and English antique oak. They are elaborately upholstered in peacock blue silk glace plush. The composite or parlor smoking car is in two apartments, the reading section containing a library, writing desk, etc., and is finished in silk glace plush and gold brown, with easy lounging chairs, sofas, ottomans, etc., as well as with movable wicker settees. The woodwork is of English antique oak in Moorish design and elaborately carved.

The dining cars are finished in French antique oak, elaborately carved, and in addition to the other conveniences, contain inclosed sections for private parties, very elaborate buffet and a wine room. No wood is exposed in the kitchen.

The first-class coaches are finished in mahogany, with high-back sofa seats, upholstered in maroon and old gold mohair plush. Each coach has gentlemen's toilet, and ladies' toilet and dressing rooms.

The second-class coach is finished in native ash with Moorish designed ceilings, rattaned sofa seats, and closet and toilet rooms.

The trucks have 42-in. steel-tired paper wheels. The entire length of each train will be about 600 ft., the longest vestibule train ever seen in this or any other country. The electric lighting system comprises a small Brotherhood engine and dynamo, which is placed in the baggage car, occupying a space of about 3 × 5 ft., and from which the wires are led through the train, thus charging the storage batteries that are carried under the cars. By this arrangement each car is electrically independent of the others, and should a car be detached for any purpose it still contains a self-sustaining supply of electricity. Each car has its own system of switches, so that the light can be turned on or off at will.

The interior trimmings are silver-plated, and the exterior, including the brake wheel and staff, are of bronze, and are also very striking in appearance.

Car Heating Notes.

The Sewall Safety Car Heating Co. has brought out in addition to the well-known Sewall direct steam heating system a method of utilizing the Baker heater and maintaing a circulation in the pipes of the Baker system by means of steam from the engine. The Baker heater can be retained in the car for emergencies or can be replaced by the Porter combination heater, which can be heated by steam from the engine, or by a small gas jet. This system is now being applied to some cars, and it is claimed that it possesses many advantages.

Large Blue Prints.

At the Nashville meeting of the American Society of Mechanical Engineers Prof. Thurston showed a blue print 2½ ft. × 14 ft. accompanied by a note, explaining the method of printing, in which he said:

"The writer has, on an earlier occasion, presented to the Society, with the kind permission of Prof. E. C Cleaves, samples of blue prints of extraordinary size, as made by a method, and with apparatus, original, it is believed, with that gentleman. That exhibited at the Washington meeting of this Society, and a similar one exhibited at the Kaaterskill meeting of the civil engineers, were 8 ft. long and 3½ ft. in width. It will be remembered that they were made on a revolving cylinder, contact being secured simply by drawing the tracing tight over the sensitive paper and the underlying felt by means of suitably arranged clamps and springs. No glass was needed, and the expense and risk, and something of the trouble, of the common method of operation was thus avoided. The writer has since had some still larger prints prepared by a still simpler apparatus and method, original with himself, and by which an almost unlimited area of surface may be printed. The blue print accompanying this paper is a sample of what may be easily done in any drawing-room in which light can be obtained for such extent of print. It is a good sample of the fine work in printing and toning which is done by Professor Cleaves for the Sibley College of Cornell University. The formulas for the reagents are derived by a systematic course of experimental investigation directed to that end some time since.

The printing apparatus used for this later work consists of nothing but a single thin board, of the length and breadth of the proposed print, with some margin for the stretching clamps. This board is covered with good felt of carefully selected quality, securely and smoothly fastened to the board by any convenient means. A line of tacks around the edge does as well, perhaps, as anything. The sensitive paper is then stretched over the felt, and the tracing drawn over that, and both are smoothly stretched by clamps or other convenient device. It is, of course, evident that it would not be practicable by this operation simply to obtain that complete contact and pressure throughout the surface in contact that is required for good work; but this desideratum is easily secured by the simplest expedient imaginable: The board is merely sprung to a flat arc in the direction either of its length or of its breadth, ordinarily in the longer line. This brings everything 'taut,' and the printing is done precisely as under glass, with the further decided advantage that no light is lost through the intervention of the glass, which, however excellent in quality, will inevitably absorb a very measurable amount.

It is obvious that this scheme will suffice to print any area of blue print that paper can be obtained to cover—a half-mile square if necessary. The amount of springing required is very small, and never enough to affect perceptibly the uniformity of the printing and the tone of the print. If it should ever seem too great, it is easy to correct the defect by first springing the board in the reverse direction; then, after drawing the covering felt and papers tight, bending it in the first proposed direction, past the straight line, and as far as may be found desirable to secure good contact. We have found this method to work quite as well as the cylinder; which we still use, however, for what we now call *small* sizes.

A New Method of Inserting and Securing Crank Pins.

In a very brief paper presented at the Nashville meeting of the American Society of Mechanical Engineers, Mr. C. C. Collins describes as follows a method used by him in setting crank pins:

Some time since, in making some experimental machinery, it was found desirable to use a crank shaft in which the crank pin could be changed, sometimes using 8 in. throw and sometimes using 12 in. throw. That is, in a part of the experiment, the piston, which was 14 in. diameter and loaded to 250 lbs. to the square inch, would have a stroke of 24 in.; then it would be changed to 16 in., these changes being made a number of times. It will be seen that with this pressure whatever method of securing the crank pin might be adopted, it must be one which, when the pin was in place, must be practically unyielding and not liable to work loose; at the same time it should be one which would allow of easy removal of the pin without injury to either crank or pin. Taper holes were bored in the crank, largest at the back side. A bush was also bored taper, and turned on the outside to fit the taper hole in the crank, so as to bring the edge to within about $\frac{3}{32}$ in. of the front face of the crank. In fitting this bush, the taper hole in the crank was scraped so as to insure the absolute truth of crank pin in relation to the shaft. The pin was then turned and fitted to the bush so that the shoulder should be at the same distance from the edge of the bush that the face of the crank was, viz., $\frac{3}{32}$ in.; this bush was then cut from end to end, so as to give it a chance to expand or contract, and it thus became a circular wedge between the crank and the pin. The end of the crank-pin is fitted into the nut, care being taken that the thread is a good fit. It is better not to make pitch of the thread too coarse. Now insert the pin and place the circular wedge in at the back between the pin and crank, and force it well home by means of the nut, and you have a pin as rigid as if it had been put in by means of shrinking, or forced in by hydraulic pressure, and yet one easily removed without injury either to pin or crank. This particular pin was never subject to a continuous test in running, but it showed, under a variety of trials, that it would stand up to its work without fault.

The Vestibule Train Patents.

The following is an abstract of the recent decision of Judges Gresham and Blodgett, briefly noticed in our last issue:

The Pullman Palace Car Co., assignee of patent No. 373,098, brought this suit against the Wagner Palace Car Co. and the Lake Shore & Michigan Southern Railroad Co. for an injunction and damages, and the question before the Court arises on a motion for an injunction *pendente lite*. The alleged invention consists in the application to cars, which when coupled compose a train, of a frame-shaped place arranged in a vertical plane parallel with the transverse plane passing through the car bed, and projected by means of backing springs for a short distance beyond the end of the car. The height of the frame plate, for the best result, it is claimed, should be substantially that of the height of the car to which it is attached, and the same should be so shaped as to allow free communication between the ends of adjacent cars. The purpose of the improvement is, first, to diminish the racking effect upon the car body, due to its momentum when suddenly brought from a state of motion to a state of rest, from any cause, as well as the same injurious consequences when the car is suddenly started from a state of rest; and secondly, to diminish the tendency to the swaying or oscillating movement which is developed when a train is running at a high speed upon an ordinary railroad track.

The invention is further illustrated in connection with the vestibule attachment to the ends of cars, for the purpose of completely inclosing the sides of the car platform, allowing a continuous inclosed aisle or passage-way between the adjacent ends of the coupled cars of a train; the vestibule feature being, however, no part of the invention.

The defendan's were not slow in appropriating Sessions' improvement by operating trains of car- of similar construction. The appropriation was so complete that the Wagner vestibule train appears to be a duplicate of the Pullman train. The defendants however used an elliptic spring to press outward the frame plate at the top, instead of employing the Sessions separate coil springs. This difference however, was formal and not substantial, both springs performing the same function.

The superiority of the Sessions improvement over any prior arrangement of the buffer between the superstructures of cars, is said to consist in the fact that the faces of the plates are constantly under opposing spring pressure, which to a great extent consolidates the train, maintains its integrity, and thereby greatly overcomes these tremendous and vibratory motions which are so disagreeable to many people in a train running at a high speed.

It appears that trains operated with the Sessions improvement move with greater steadiness, passengers can sleep more comfortably in the upper berth, the car lamps are capable of being burned with a higher flame, and persons affected with nausea suffer less. If the frictional resistance plates perceptibly diminish oscillation and vibration, and thereby add to the comfort and safety of the passengers, there is merit in it. The testimony shows that the Sessions device accomplishes these results.

None of the various patents relied upon as having anticipated the Sessions improvement were intended to prevent the oscillation or vibration, and none of them embody the substantial features of the Sessions invention. The complainant has established a fair prima facie case in favor of its validity.

Mr. Frank I. Whitney, Western Passenger Agent of the Lake Shore & Michigan Southern, is reported to have said that the decision of Judge Gresham does not affect the vestibuling of cars. The Lake Shore will continue its Wagner vestibule limited in all essential respects the same as heretofore. The contention of the Pullman Co. is that the face plates in the diaphragm or bellows-shaped arrangement at the end of the car, brought in close contact by heavy springs, reduces the oscillatory or swaying motion of the cars when running over crooked roads at a high rate of speed. This may be of some importance to the Pullman Co., who operate cars on the Pennsylvania system, that has very sharp curves and steep grades, but it cuts no figure with the Lake Shore and New York Central, over which the Wagner vestibule is run, on account of the long tangents and low grades. There will be no difference whatever in the appearance of our cars, as it was only a very light spring that was in use, and never brought the plates into rigid contact. The connections between the cars will be made by the same diaphragm or bellows-like attachment as they are at present.

Indexed Abridgements of Patents.

At the stated meeting of the Franklin Institute, April 18, a preamble was offered setting forth that there is great need of the preparation and publication of properly classified abridgements of letters-patent and that the funds available are amply adequate for the purpose. Accordingly the following resolution was adopted:

Resolved, That the Franklin Institute earnestly recommends and urges upon the representatives in Congress to give operative effect to the recommendation of the Commissioner of Patents, by enacting promptly such laws as will secure the preparation, by persons of competent skill and knowledge, of concise and thoroughly indexed classified abridgements of patents for invention, and the publication thereof and the placing of such publications on sale at moderate charges, and accessible to the public in libraries for the better diffusion of knowledge on such subjects.

The Pneumatic Train Signal.

The Vandalia line has just completed the work of equipping its passenger trains with the Westinghouse air signals, and will put them into general use in a few days.

RAILROAD LAW—NOTES OF DECISIONS.

Carriers of Goods and Injuries to Property.

In Michigan a bill for an injunction against a railroad to restrain it from entering on a homestead averred that the complainants are in possession of their homestead, and that defendants are claiming the right to enter under a so-called license from one of the complainants. It appeared that the defendant had a license from one of the complainants to construct its roadbed across said homestead, but such license was not signed by the wife, the other complainant. The Court held that it will issue an injunction to restrain defendant from violently invading the premises, and tearing down buildings in the construction of its roadbed.[1]

In Iowa a steer with eighty other cattle was being herded by a boy. He left them for an indefinite period, went home, and another boy returned, and without noticing the steer in question, which had separated from the rest, drove the cattle hurriedly across the defendant's railroad track to avoid an approaching train, leaving the steer behind. It was afterwards killed on the track. The Supreme Court rules that it was "running at large" within the statute.[2]

In North Carolina the Supreme Court rules that where commissioners have met and assessed the damages and benefits accruing to a piece of land from the construction of a railroad across it, it will be presumed that they followed the correct rule in so doing; and their report will not be set aside because the item reported for benefits does not show in what the benefits assessed consist.[3]

In Alabama it is held by the Supreme Court that a public common, laid off and dedicated to the public use of a city or town to which it is adjacent, is not governed by the rules of law which apply to the public streets and highways, and the owner of a lot or parcel of land abutting on it outside the limits of a city or town cannot enjoin the construction of a railroad upon or across it by permission of the corporate authorities, although it may obstruct travel or other communication between his place and the city or town.[4]

In New York the Court of Appeals holds that where goods are delivered to a carrier for transportation under an agreement which does not provide for any restriction of the carrier's common-law liability, the mere fact that it was contemplated that a bill of lading would be thereafter furnished will not (especially in the absence of any evidence of a course of business between the parties or of any custom or usage sanctioning such an interpretation of their preceding negotiation) justify the carrier in inserting in such bill of lading clauses restrictive of the usual liability of carriers; and in such a case the carrier's liability will be governed by the original agreement and not by the bill of lading.[5]

In Georgia suit was brought against a railroad company, alleging that certain hams were delivered to the defendant at Opelika, to be carried thence to Columbus, and there delivered to the plaintiff, and that for want of due care and diligence by the defendant and its servants, the hams, while in its custody, became unsound and damaged, and that, upon the refusal of the plaintiff to receipt for them as in good order, the defendant refused to deliver them and appropriated them to its own use. There was no bill of lading or receipt of the goods from a connecting line of railroad, and the evidence of the plaintiff himself was that in all probability the hams were damaged before they were delivered at Opelika, and the character of the damage itself negatived any theory that it occurred within that time during which the hams were in defendant's possession. The Supreme Court holds that the railroad is not liable.[6]

In North Carolina, it having been proved that there was never any station agent at a certain point of defendant's line of railroad, no agent's office, no books kept, tickets sold or bills of lading given, but that conductors had frequently stopped trains there to receive and let off freight and passengers, the Supreme Court holds that the place was not a regular station within the meaning of a statute, imposing a penalty for refusal to receive and forward freight when tendered at a regular station.[7]

In Mississippi the Supreme Court decides that evidence that horse tracks were found on the railroad track, after the horse in question was found injured in a ditch where he had fallen from a bridge over a creek, 40 or 50 yards from the track, will not support a verdict against the railroad company in an action brought by the owner of the horse for the injury, in the absence of proof that the horse was struck or injured by the train of the company.[8]

In another somewhat similar case the same court holds that evidence showing that a horse near a railroad when a train came along ran alongside the train until so terrified that it ran into some pits, where it was injured, not, however, having been struck by the train, is not sufficient to support a judgment for damages against the railroad company, no wrong being shown to have been done by its servants.[9]

In Alabama it is held that the conductor in charge of a freight train has implied authority, in such an emergency as the sickness of one of his brakemen to employ a person to take his place. But a railroad is not liable for injuries to a passenger while acting as brakeman under the orders of the conductor, whom he was under no obligation to obey, and by whom he was not employed for that purpose.[10]

Injuries to Passengers, Employes and Strangers.

In Kansas it is held by the Supreme Court that a railroad has a right to adopt and enforce a rule that passengers shall procure tickets before taking passage on freight trains. But such a rule imposes on the company the necessity of having its offices open a sufficient length of time before the starting of the trains for the passengers to procure them. So where a passenger desiring to take passage upon its freight train endeavors to procure a ticket, but, by reason of the ticket office being closed, he is unable to do so, he has the right to travel on such train by paying or offering to pay, the usual fare. And when a passenger is ejected for not having a ticket he may show that the rule had been waived and was not enforced by bringing persons who have ridden on the trains and been allowed to pay their fares on board.[11]

In a similar case in the same state, the Court says that if the conductor or brakeman of a freight train repairs to the caboose of the train after all the passengers are aboard, and announces, loud enough for all the passengers to hear, that it is necessary for all persons who desire to ride upon the train to procure tickets before the train starts, and ample time and opportunity is given thereafter for persons to procure tickets, then sufficient publicity is given to the passengers upon the train of the rule of the company, and the right of expulsion for non compliance with this regulation may be exercised, after leaving the station, at any suitable place.[12]

In Kansas it is held by the Supreme Court that a railroad has the right to designate what stations only its fast trains shall stop at, and a passenger must acquaint himself with the regulations in this regard.

Where a person purchases a railroad ticket for a designated station upon a railroad, without making any inquiries or ascertaining what train stops at the station to which he desires to go, and subsequently takes his seat upon a car of a train which, according to the regulations of the company, does not stop at the station for which he has the ticket; and such person refuses to pay his fare, on the demand of the conductor, to the next station at which the train is to stop, and also refuses to leave the train when requested so to do by the conductor after he has stopped the train at a suitable place for that purpose, such person is a trespasser upon the train. If he resists he may be ejected with force, and it makes no difference that he was directed to the train in question by the mistake of the ticket agent of the company.[13]

In Louisiana, the Supreme Court rules that the obligation

of a sleeping car company for injury to a stranger who enters the car for the purpose of asking the privilege of washing his hands, and is there wantonly and without provocation assaulted and beaten by the porter of a car, is not governed by the principles regulating the liability of common carriers, under the contract of carriage, for like assaults committed by servants on their passengers. There being no liability on an implied contract the case is governed by the ordinary rules as to master and servant. In this relation the master is responsible only for what the servant does in the course of his duty and instructions. The facts that the party injured was not a trespasser, but was lawfully on defendant's premises, and was properly dealing with defendant's servant as a servant, do not suffice to fix defendant's liability, if the assault was wanton and entirely foreign to the functions committed to the servant; otherwise a bank or a merchant or a householder would be liable for wanton assaults committed by their clerks or servants upon customers or visitors, which liability would clearly not exist unless the masters were guilty of fault in employing so dangerous a servant.

There having been no witness, and the plaintiff and the porter giving very different accounts of the affair, ratification of the misconduct cannot be inferred from the retention of the porter, when the defendant so acted because it honestly believed the latter, and thought it just to maintain the *status quo*, at least until judicial determination of the conflict.[14]

In Pennsylvania the grade of a city street was changed by the city authorities. The road bed of the street was raised. A railroad company's track bounded the street on one side. The company raised its tracks by putting them on sleepers or ties of the new elevation. Before the spaces between these ties had been filled in, a workman engaged in rolling the road bed of the street slipped on the street and fell into one of the spaces between these ties. The roller tilted from the street, was caught between the sleepers, and the workman was injured in consequence of the roller falling upon him. When the workman fell he was walking backward down hill, keeping to the right of the road. The Supreme Court holds that the workman was negligent, and cannot recover damages from the company.[15]

In Indiana it appeared that two nearly parallel lines of track owned by a railroad company were used as mere switches, for the purpose of connecting a pork packing establishment with the various lines of railroad coming into a neighboring city, and to enable the companies operating such lines to haul freight of various kinds over such switch lines to and from such establishment. The plaintiff, in the employ of the connecting roads, to whose use the switch tracks were dedicated, as a locomotive engineer, and, in charge of a switch engine, was pulling out from the packing-house a cut of cars on the western line of switch; and, when he had reached a point north of the track of the main line of railroad track, his engine was run into by a car being backed upon the eastern switch line, which at the crossing of the main line of railway, by reason of the insecure crossing, broke from the switch line passing on to the main track, and, colliding with the plaintiff's engine as he was crossing the main track, injured him by the collision. The Supreme Court decides that the negligence of which the defendant roads were guilty, in permitting the crossing to continue in its insecure condition, rendered them liable for such injury.[16]

In Kansas a woman attempted to cross a railroad crossing with a team and wagon. She had just observed the passenger train pass and was not expecting any other train at that time, although she had seen a freight train standing on the track headed that way in the town which she had just left. The railroad at that point cuts through a hill, so as to obstruct the view from the wagon road. She was familiar with the crossing, having crossed there many times before, and had always used great care in looking for trains. On this occasion she did not stop to look or listen; her team came into collision with a passing engine, and one horse was killed and the wagon was overturned. The Supreme Court rules that she was negligent and cannot recover.[17]

In Virginia the shortest route from a village to its railroad station was a path across a switch. The company's agents, with the knowledge of its officers, habitually parted the cars standing on this switch so as to leave a space between them near this path. A pedestrian on his way to the station crossed this track when such space was only 18 inches, and was caught and killed by the sudden backing of the train. When he reached the track he could not see the engine, and he had no notice that the cars were about to start. The Supreme Court of Appeals holds that the company was liable, its acts in keeping this crossing open constituting an invitation to the public to use it in coming to the station.[18]

In Texas, the plaintiff attempted to cross a bridge constructed by a railroad on a portion of a public road, crossing its right of way. Plaintiff knew the bridge was not in good repair, but that it was crossed by travelers in wagons and on horseback. This was the only practicable crossing for him in the direction he was traveling. While crossing on horseback he was injured by reason of a defect in the bridge. The Supreme Court holds that the plaintiff was not negligent, and that the company is liable in damages.[19]

[1] Evans v. S. R. L. & D. R. Co., 36 N. W. Rep., 688.
[2] Valleau v. C., M. & St. P. R. Co., 36 N. W. Rep., 760.
[3] Wilmington & W. R. Co. v. Smith, 5 S. E. Rep., 237.
[4] Sheffield & T. S. R. Co. v. Moore, 3 South. Rep., 686.
[5] Park v. Preston, 11 Cent. Rep., 280.
[6] C. & W. R. Co. v. Tilman, 5 S. E. Rep., 135.
[7] Kellogg v. Suffolk & C. R. Co., 5 S. E. Rep., 379.
[8] N. O. & N. E. R. Co. v. Jones, 3 South. Rep., 652.
[9] N. O. & N. E. R. Co. v. Jones, 3 South. Rep., 654.
[10] Propst v. Ga. Cent. R. Co., 3 South. Rep., 764.
[11] Brown v. K. C., Ft. S. & G. R. Co., 16 Pac. Rep., 942.
[12] South Kas. R. Co. v. Husdale, 16 Pac. Rep., 937.
[13] A., T. & S. F. R. Co. v. Gants, 17 Pac. Rep., 55.
[14] Williams v. Pullman Palace Car Co., 3 South Rep., 631.
[15] Kelly v. M. & R. I. P. R. Co., 11 Cent. Rep., 415.
[16] Indiana, B. & W. R. Co. v. Barnhart, 13 West. Rep., 427.
[17] Durbin v. O. R. & N. Co., 17 Pac. Rep., 5.
[18] Nichols v. W. O. & W. R. Co., 5 S. E. Rep., 171.
[19] Gulf, C. & S. F. R. Co. v. Gascamp, 7 S. W. Rep., 227.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, 2 dollars per share on the preferred and common stock, payable June.

Chicago, Burlington & Quincy, quarterly, 1 per cent., payable June 15.

Chicago & Eastern Illinois, quarterly, 1½ per cent. on the preferred stock, payable June 1.

Chicago & Indiana Coal, quarterly, 1½ per cent. on the preferred stock, payable June 1.

Fitchburg, 2 per cent. upon the preferred stock, payable May 15.

Pennsylvania, semi-annual, 2½ per cent., payable May 29.

St. Louis & San Francisco, 2½ per cent. upon the preferred stock.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Ohio Institute of Mining Engineers* will hold its summer meeting at Logan, O., commencing July 11.

The *International Association of Car Accountants* will hold its annual meeting in Montreal, Can., June 19.

The *American Institute of Mining Engineers* will hold its fifty-first meeting at Birmingham, Ala., commencing May 15.

The *American Train Dispatchers' Association* will hold its fifth annual meeting at Louisville, Ky., June 12.

The *National Association of General Passenger and Ticket Agents* will hold its fall meeting in Saratoga, N. Y., Sept. 18.

The *National Association of General Baggage Agents* will hold its next meeting in New York City July 18.

The *Master Car-Builders' Association*, annual convention, Alexandria Bay, N. Y., commencing June 12.

The *American Railway Master Mechanics' Association*, next annual convention, Thousand Islands, N. Y., June 19.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The *Western Railway Club* meets in Chicago the third Wednesday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, N. Y.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *Engineers' Club of St. Louis* meets the first and third Wednesday of each month till June.

The *Engineers' Society of Western Pennsylvania* meets in Pittsburgh the third Tuesday of each month.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Pacific, annual meeting, Boston, Mass., May 17.

Burlington, Cedar Rapids & Northern, annual meeting, Cedar Rapids, Ia., May 22.

Canada Southern, annual meeting, St. Thomas, Ont., June 6.

Chicago, Burlington & Quincy, annual meeting, Chicago, Ill., May 16.

Chicago, Milwaukee & St. Paul, annual meeting, Milwaukee, Wis., June 2.

Chicago & Northwestern, annual meeting, at the office in Chicago, Ill., June 7.

Chicago, Rock Island & Pacific, annual meeting, Chicago, Ill., June 6.

Chicago, St. Paul, Minneapolis & Omaha, annual meeting, Hudson, Wis., June 9.

Denver & Rio Grande, annual meeting, Denver, Col., May 22.

Des Moines & Fort Dodge, annual meeting, Des Moines, Ia., June 7.

Flint & Pere Marquette, annual meeting, East Saginaw, Mich., May 16.

Middletown, Unionville & Water Gap, annual meeting, 15 Cortlandt street, New York City, May 28.

Milwaukee, Lake Shore & Western, annual meeting, Milwaukee, Wis., June 13.

Missouri, Kansas & Texas, annual meeting, Parsons, Kan., May 16.

New York & Harlem, annual meeting, New York City, May 15.

New York, Providence & Boston, special meeting, Providence, R. I., May 17.

Omaha & St. Louis, annual meeting, Stanberry, Mo., May 15.

Pittsburgh, Fort Wayne & Chicago, annual meeting, Pittsburgh, Pa., May 16; special meeting, June 13.

Pueblo & Arkansas Valley, annual meeting, Pueblo, Col., May 12.

Richmond & Danville, special meeting, Richmond, Va., May 21.

St. Joseph & Grand Island, annual meeting, Elwood, Kan., June 12.

St. Louis Alton & Terre Haute, annual meeting St. Louis, Mo., June 4.

Vicksburg & Meridian, annual meeting, 40 Wall street, New York, May 7.

New York Railroad Club.

The May meeting of the New York Railroad Club will be held at their rooms at 113 Liberty street, New York, May 17, 1888, at 8 p. m. The pin and link and vertical plane types of automatic draw-bars for freight cars will be discussed.

American Association of Railway Chemists.

The fourth regular meeting of this association will be held at the Stillman Hotel, Cleveland, O., May 14, 15 and 16, 1888. The sessions of the 14th will be private, but those of the 15th and 16th will be open to all interested in the subject, which will be "Oils for Railway Use." Oil refiners, dealers and chemists are especially invited to attend, and are requested to bring oil-testing apparatus and full records of their methods, investigations and experiments. The following will be the order of discussion:

LUBRICATING OILS.

General discussion upon the character of oils used for lubricating passenger cars, freight cars and locomotives. Subjects for special discussion:

1. *Flashing and Burning Tests.*—Relation to lubricating quality. Advisability of having but one kind of tester and a uniform method of making the tests.

2. *Thermometers.*—Variation of. Importance of having them correct. Manner of obtaining and correcting.

3. *Cold Tests.*—The following report of the committee upon a standard method of making the cold test of oils will be discussed.

Definitions.—The cold test of an illuminating oil shall mean that temperature at which it shows turbidity, ½ in. in height, at the bottom of the bottle when tested with the standard apparatus, and in the manner hereafter described.

The cold test of a lubricating oil shall mean that temperature at which it will just flow when tested with the standard apparatus and in the manner hereafter described.

Standard Apparatus.—Box, white glass bottle and thermometer of shape and size shown on drawings, figs. 1, 2 and 3.

Method of Making the Test.—Put two ounces of the oil to be tested in the bottle and insert the thermometer through the cork until the bulb is near the centre of the bulk of the oil. After packing the freezing chamber with ice or a mixture of salt and ice, suspend the bottle in the cold air chamber (by means of the brass frame shown in the accompanying drawing, fig. 2 C.), so that it does not touch the sides or bottom. Place a second thermometer in the cold air chamber so that it does not touch the sides or bottom and keep at the desired temperature until both thermometers register about the same degree. Then proceed as follows:

For the cold test of illuminating oils: Note the reading of the thermometer suspended in the oil when the turbidity of the oil has reached the height of ½ in.

For the cold test of lubricating oils: Note the reading of the thermometer suspended in the oil when the oil just ceases to flow, when the bottle is lifted from the cold air chamber and inclined.

W. D. GREGORY,
W. L. BROWN,
G. M. DAVIDSON,
Committee.

The committee recommend the following points for discussion:

1. The oil bottle is to be lifted, inclined and examined each five degrees of drop in temperature of its contained thermometer until the oil thickens, then at each two degrees till the cold point is reached.

2. The sample of oil is not to be disturbed, but it is to remain three hours at rest in the cold air chamber at the particular temperature at which the oil is supposed to just flow.

3. Shall the oil be heated or chilled to any definite temperature before commencing to make the test? Shall the oil be allowed to remain in the laboratory till the sample has reached the normal temperature of the room before commencing to make the test or shall the cold test be started immediately after the sample of the oil is taken from the barrel or tank?

4. Can the method for making the cold test of mineral oil be used for determining the cold test of animal and fish oils?

4. *Viscosity.*—Relation of the lubricating quality. Standard instrument for.

5. *Specific Gravity.*—Best method of determining (hydrometer or balance). At what temperature?

6. *Miscellaneous Tests.*—Ash, tar, loss, acid, etc.

7. *Lubrication Tests.*—Mechanical. Practical in service (best method of making).

8. *Cylinder Oils.*—Composition of. Proportions for, etc.

ILLUMINATING OILS.

Mineral Oils.

1. Flashing and burning tests. Instrument and method.
2. Specific gravity.
3. Cold tests.
4. Burning tests, photometric, lamp and lantern, special apparatus for, etc.
5. Composition, distillation tests, etc.
6. Color.

Animal Oils.

1. Free acid (influence of on illuminating quality).
2. Cold tests.
3. Adulterations, influence of, detection of, etc.

Signal Oils.

1. Composition, special tests, etc.

MISCELLANEOUS.

Including oils for shop machinery, cooling compounds, waste, influences of various methods of oiling, and methods of handling, mixing and purchasing oils.

H. B. HODGES, Secretary.

Engineers' Club of Philadelphia.

A regular meeting was held April 21, 1888. Mr. L. F. Rondinella presented a series of steam formulæ for the reference book.

Mr. Wm. Sellers presented a paper on the "Manufacture of Eye Bars for Pin Connected Structures," illustrated by full size test specimen, etc.

Mr. John L. Gill, Jr., discussed the desirability of expanding in, and of beading over, boiler tubes, and raised the point as to whether beading over was not in some cases unnecessary or even injurious.

The President announced the following as the committee to recommend a practical method of testing cements, the appointment of which was authorized at business meeting, March 17, 1888, in accordance with the request of Mr. Arthur Marichal: Messrs. Arthur Marichal (Chairman), Herbert Bamber, Prof. L. M. Haupt, Rudolph Hering and John C. Trautwine, Jr.

Master Car-Builders' and Master Mechanics' Conventions.

Arrangements are being made for special trains and special rates to and from these conventions, which are to be held at the Thousand Islands, Alexandria Bay, N. Y., June 12 and 19. Full particulars can be obtained by prompt application to the New York Railroad Club Rooms, 113 Liberty street, New York.

Engineers' Club of St. Louis.

A regular meeting was held May 2. Prof. A. E. Phillips was elected a member. The Librarian reported the completion of an index of the club's books and pamphlets, including publications received by the index department of the Journal, which had been presented to the club. Mr. Wheeler reported the action of the Engineers' Club of Kansas City on the subject of improvement in highway bridges. The matter of action by the St. Louis Club was referred to a committee, consisting of H. W. Wheeler, C. H. Sharman and M. G. Schinke. Mr. J. A. Ockerson resigned the office of Vice-President on account of continued absence from the city. Col. E. D. Meier read a paper on the Prall system for distributing heat and power from central stations. The subject was discussed by a number of members.

New York Railroad Club.

The May meeting of the Club will be held at 113 Liberty street, New York, on May 17, at 8 p. m. The subject for discussion announced is, "Automatic Draw-Bars for Freight Cars." Link and pin type and vertical hook type will be discussed.

American Institute of Mining Engineers.

The Louisville & Nashville officers will take particular pains to make the meeting of the American Institute of Mining Engineers at Birmingham, which begins May 15, an interesting one. A special train of four cars will be at the service of the visitors every day during the Convention. Trips will be made out on the Birmingham Mineral Railroad to Bessemer, over the Blue Creek Extension to Woodstock, and to various other points. Stops will be made at the various mines and furnaces, and various officials of the railroad, as well as resident mining engineers, will accompany the parties.

Master Car-Builders' Association—Annual Meeting.

The Twenty-first annual convention of the association will be held in the Thousand Island House, at Alexandria Bay, beginning Tuesday, June 12, 1888, at 10 a. m.

Alexandria Bay is in Jefferson County, New York, on the St. Lawrence River, near the outlet of Lake Ontario, and 12

miles from Clayton, a terminus of the Rome, Watertown & Ogdensburg Railroad. Boats for Alexandria Bay run in connection with trains arriving at Clayton. Connections are made at Supsension Bridge, Niagara Falls, Rochester, Syracuse, Rome and Utica, with the Rome, Watertown & Ogdensburg Railroad. Or persons from the east may go to Ogdensburg by the Ogdensburg & Lake Champlain Railroad, and from there by boat to Alexandria Bay. Passengers on the Grand Trunk Railway can connect by steamboat for Alexandria Bay at Kingston, via Cape Vincent and Clayton, or at Gananoque or Brockville for Alexandria Bay.

The rates at the Thousand Island House during the Convention will be $3 per day to members of the association and their families, and $4 per day to those who are not members. Those who wish to engage rooms in advance should apply to R. H. Southgate, Hotel Brunswick, New York City, and should state for what length of time they will occupy them.

M. N. FORNEY, Secretary.

PERSONAL.

—T. E. Nash, Superintendent of the Government Railway Mail Service, has resigned.

—J. B. Wilson, Mechanical Superintendent of the Duluth, South Shore & Atlantic, has resigned, to take effect June 1.

—A. F. Nims has been appointed City Engineer of Nebraska City, Neb., where extensive municipal improvements are to be made.

—Coleman Sellers, of Philadelphia, the distinguished mechanical engineer, who has just retired from active professional work, has been appointed to the new chair of Engineering Practice at the Stevens Institute of Technology, and delivered his first lecture at the Institute at Hoboken, N. J., May 9.

ELECTIONS AND APPOINTMENTS.

Albion & Corydon.—The following are the directors of the reorganized company: M. J. O'Connor, G. W. Applegate and R. J. Tracewell, Corydon, and H. H. Littell, St. John Boyle. B. G. Boyle, John E. Green and G. W. Applegate, Louisville, Ky.

Atchison, Topeka & Santa Fe.—J. P. Hall has been appointed Colorado Passenger Agent, with headquarters at Denver, Col., to succeed George Ady.

Atlantic, Birmingham & Kansas City.—The following are the officers of this company: President, Henry M. Newman, of New York; Secretary and General Manager, Henry D. Capers, of Adairsville, Ga.; Treasurer, E. B. Lewis, of Montezuma.

Baltimore & Ohio.—L. S. Allen has been appointed Northwestern Passenger Agent, with office in Chicago, succeeding T. H. Dearborn, resigned on account of ill health.

Burlington & Missouri River.—The following appointments have been made: D. Hawksworth to be Superintendent of Motive Power and car department, with headquarters at Plattsmouth, Neb.; J. C. Salisbury to be Master Mechanic of the Northern Division, with headquarters at Lincoln; E. S. Grensel to be Master Mechanic of the Eastern Division, with headquarters at Plattsmouth; A. B. Perie, Master Mechanic of the Southern Division, with headquarters at Wymore, and A. B Archibald, Master Mechanic of the Western Division, with headquarters at McCook.

California Southern.—H. C. Whitehead has been appointed Auditor, with office in San Diego, Cal.

Canadian Pacific.—The following directors were elected at the annual meeting held in Montreal, May 9: Sir George Stephen, W. C. Van Horne, Sir Donald A. Smith, Richard B. Angus, Montreal; Edmund B. Osler, Toronto; Sandford Fleming, Ottawa; J. J. C. Abbott, Montreal; George A. Kirkpatrick, Kingston; R. V. Martinsen, New York; W. L. Scott, Erie, Pa.; George R. Harris, Boston: Levi P. Morton and Richard J. Cross, New York; Wilmot D. Matthews, Toronto; Sir P. Grenfell, London. Sir George Stephen was re-elected President, and W. C. Van Horne Vice-President.

Cape Fear & Yadkin Valley.—At the annual meeting held last week the old board of directors and officers were re-elected.

Cape May & Delaware Bay.—The following officers were elected at the annual meeting last week: President, E. Thielans; Secretary, Treasurer and General Manager, J. Henry Edmunds; Directors, E. Thielans, J. Henry Edmunds and John H. Hanes.

Cedar Rapids & Clinton.—The old board of directors have been re-elected and the following officers chosen: C. J. Ives, President; J. C. Broecksmit, Vice-President; W. P. Brady, Secretary; S. S. Dorwart, Treasurer; P. F. White, Chief Engineer.

Cedar Rapids, Iowa Falls & Northern.—The old board of directors have been re elected and the following officers chosen: C. J. Ives, President; J. C. Broecksmit, Vice-President; W. P. Brady, Secretary; S. S. Dorwart, Treasurer; P. F. White, Chief Engineer.

Chicago, Decorah & Minnesota.—The old board of directors have been re-elected and the following officers chosen: C. J. Ives, President; J. C. Broecksmit, Vice-President; W. P. Brady, Secretary; H. H. Hollister, Treasurer; S. S. Dorwart, Assistant Treasurer; P. F. White, Chief Engineer.

Chicago, Kansas & Nebraska.—W. I. Allen, has been appointed General Superintendent, with headquarters at Topeka, Kansas.

Charles Dunlap has been appointed Superintendent of the Eastern Division, with headquarters at Horton, Kansas.

Chicago, Milwaukee & St. Paul.—W. D. Carrick has been appointed General Baggage Agent, with headquarters at Milwaukee, Wis., in place of D. M. Christie, resigned.

Chicago & West Michigan.—At the annual election the old board of directors was re elected, excepting that A. H. Hardy was chosen to fill the vacancy caused by the death of Alpheus Hardy.

Chicago, St. Louis & Pittsburgh.—M. A. Look has been appointed Engineer Maintenance of Way of the 2d and 4th divisions, vice L. F. Lowe transferred to the Cleveland & Pittsburgh.

Chicago, Santa Fe & California.—The following directors were elected at the annual meeeting in Chicago: Norman Williams, A. W. Nickerson, E. S. Washburn, Edson Keith, William B. Strong, Charls L. Hutchinson, J. B. Morrison, Sidney A. Kent, Nelson Morris, Wm. J. Watson, Benj. P. Cheney, Abram Poole and Isaac T. Burr. Officers: President, William B. Strong; First Vice-President, C. W. Smith; Second Vice-President, A. A. Robinson; Secretary, Chas. S. Swest; Treasurer, D. L. Gallup.

Cincinnati & Birmingham.—The following directors were elected at a meeting held in Fayetteville, Tenn., last week: H. K. Boyson and J. C. Dougherty, of Fayetteville; W. D. L. Record, of Lynchburg; W. R. French and M. L. Campbell, of Tullahoma, and H. A. Wiley, of Woodbury.

Cincinnati, Indianapolis, St. Louis & Chicago.—L. Rush Brockenbrough has been appointed Assistant General Freight Agent, with headquarters at Cincinnati, Ohio.

Cincinnati, New Orleans & Texas Pacific.—D. G. Edwards has been appointed Assistant General Passenger Agent of this system of roads, with headquarters at Cincinnati, vice C. B. Gray, deceased.

Coronado Beach.—The following are the officers of this company: H. L. Story, President; E. S. Babcock, Jr., Vice-President; O. J. Tyler, Secretary, Coronado Beach, Cal.

Colorado Midland.—Charles E. Noble has been appointed Treasurer, with office at Colorado Springs, Col., to fill the vacancy caused by the resignation of Irving Howbert.

Cooperstown & Charlotte Valley.—The following is the first board of directors of this new company: E. W. Harris, George Brooks, D. E. Siver, Edwin S. Bundy, J. F. Renstle, Charles R. Burch, James F. Clark, Paul T. Brady, George Bissell, John K. Leaning, Horace Lathrop, George Gould and J. Warren Lamb.

Denver, Texas & Fort Worth.—At the annual meeting, held at Denver, Col., May 3, the following board of directors was elected: Sidney Dillon, John Evans, S. Tilghman, F. K. Hain, James Stillman, W. J. Walters, Henry Lewis, Morgan Jones and T. W. Pearsall.

Duluth, Glencoe & Southwestern.—The officers of this new Minnesota company are as follows: President, A. H. Reed; Vice-President, H. Wadsworth; Treasurer, G. K. Gilbert; Secretary, E. A. Chilel, all of Glencoe.

East Alabama.—The road has passed into the control of the Central of Georgia, and the following directors have been elected: M. S. Belknap, W. H. McClintock, T. E. Blanchard, Cecil Gobbett, P Harrison, H. H. Epping and E. P. Alexander.

Eastern in New Hampshire.—At the annual meeting held in Portsmouth, N. H., last week, the following directors were elected: Moody Currier, Dexter Richards, E L. Giddings, E A Abbot, W. H. Goodwin, F. A. Philbrick, S. C. Eastman The directors organized be electing M. Currier President, and W. H Hackett, of Portsmouth, Secretary.

International & Great Northern.—This road, which has been taken out of the hands of the Missouri, Kansas & Texas company, is now operated independently and has the following officers: W. H. Boyd, Acting Superintendent; J. E. Galbraith, General Freight Agent, and B. W. McCullough, General Passenger Agent, with headquarters in Palestine, Tex.

Iowa City & Western.—The old board of directors have been re-elected, and the following officers chosen: C. J. Ives, President; J. C. Broecksmit, Vice-President; W. P. Brady, Secretary; S. S. Dorwart, Treasurer; P. F. White, Chief Engineer.

Kansas City & Southern.—The following directors were elected at the annual meeting held in Clinton, Mo., May 1: James A. Blair, Kansas City; John D. Vail, D. C. Blair, Blairsville, N. J.; Conrad Miller, Bangor, Pa.; A. J. Blair, Belton, Mo.; E. L. Martin, Kansas City; H. W. Salmon, Clinton, Mo.; John O'Grady, St. Louis; William Bailey, St. Louis, and R. D. Blair, Clinton, Mo.

Lawrence, Emporia & Southwestern.—At the annual meeting held in Lawrence, Kan., the following directors and officers were elected: O. E. Learnard, George J. Barker, J. D. Bowersock, L. Bullene and G. W. E. Griffith, of Lawrence; H. C. Cross, L. P. Heritage, Calvin Hood and William Martindale, of Emporia. Officers: O. E. Learnard, President; H. C. Cross, Vice-President; Calvin Hood, Secretary; G. W. E. Griffith, Treasurer.

Little Rock & Fort Smith.—The officers elected last week are as follows: George J. Gould, President; Henry Wood, Vice-President; A. H. Calef, Treasurer, and J. M. Dill, Secretary. The same officers were also elected for the Kansas & Arkansas Valley and the Little Rock Junction roads.

Mexican Central.—The following directors and officers were elected at the annual meeting in Boston last week: Oliver Ames, J. T. Burr, J. Edwards, A. B. Lowrie, E. E. Morse, F. P. McIntyre, A. W. Nickerson, William Roth, Warren Sawyer, Joseph H. White, G. B. Wilbur, and Levi C. Wade, of Boston; L. Z. Leiter, Chicago; Joseph Richardson, New York; Robert R. Symon, London, Eng.; Sebastian Camarcho, Edward W. Jackson, Mexico.

Michigan Central.—At the annual meeting this week the old board of directors and officers were re-elected.

Mobile, Hattiesburg & Jackson.—The following directors were elected at a meeting held last week: John Kamper, R. L. Saunders. C. W. Robinson, O. J. Waite, Byron Lemly, W. L. Nugent and S. S. Carter. S. S. Carter was elected President and W. L. Nugent Secretary.

New Brunswick.—A. J. Heath has been appointed General Passenger and Ticket Agent, with office at St. John, N. B., vice J. T. Leavitt, resigned.

New York, Chicago & St. Louis.—At the annual meeting last week the following directors were elected: William K. Vanderbilt, Cornelius Vanderbilt, Frederick W. Vanderbilt, Hamilton McK. Twombly, John S. Kennedy, James A. Roosevelt, Frederick P. Olcott, Chauncey M. Depew, New York; Allyn Cox, Mount Vernon, N. Y.; Charles M. Reed, Frank A. Mizener, Erie, Pa.; Jeptha H. Wade and Daniel W. Caldwell, Cleveland.

New York, Lake Erie & Western.—W. M. Corbett has been appointed Train Master of the Delaware Division, vice J. M. Warner, resigned.

New York, Mahoning & Western.—The following are the officers of this company: C. N. Haskell, Vice-President and General Manager; J. K. Brice, Chief Engineer; W. A. Armstrong, Assistant Secretary and Treasurer; W. H. Harris, counsel. General offices, Toledo, Ohio.

Norfolk & Western.—At the annual meeting held last week at Roanoke, Va., the following directors were elected: C. H. Clark, F. J. Kimball, Charles Hacker, Joseph I. Doran, Robert T. Minturn, Richard S. Brock, Samuel A. Crozer, E. J. Dull, Upton L. Boyce, Walter H. Taylor, Robert Fleming, W. C. Houston, Jr., Howland Davis.

Charles S. Churchill has been appointed Engineer-in-Chief of the extension from Elkton, W. Va., to Ironton, O.

Omaha, Dodge City & Southern.—T. M. Hoover, Dodge City, Kan., is president of this company, and C. E. Gallagher is vice-president and chief engineer.

Oregon & California.—At the annual meeting last week the following directors were elected: Leland Standford, C. P. Huntington, Timothy Hopkins, H. B. Huntington, Charles Crocker, Richard Koehler, Donald Macleay, John McCracken, R. P. Earhart, W. W. Bretherton and George H. Andrews.

Pennsylvania.—Rufus Hill has been appointed Master Mechanic in charge of locomotive repairs at Camden, N. J.

Philadelphia & Atlantic City.—The following Board of Directors was elected at the annual election held in Camden, N. J., this week: Austin Corbin, A. A. McLeod, S. A. Caldwell, William Massey, Walter S. Massey, James M. Hall, Albert Foster, Samuel Garwood, A. G. Richey, William Black, Theodore B. Gibbs, J. Alfred Bodine, Howard T. Naisby.

Philadelphia Underground.—The Market street and the Broad street underground railroads have been chartered in Pennsylvania with the following directors (the same in both companies): P. P. Bowles, J. W. Woodside, J. C. Dotter, H. M. Dubois. J. E. Barr, J. H. Haddock and F. W. Smith, all of Philadelphia.

Pine Bluff & Swan Lake.—Frank Silverman has been appointed Receiver, with office in Pine Bluff, Ark.

Pittsburgh & Western.—At the annual meeting, May 7, in Allegheny City, Pa., the following directors were elected: James Callery, John W. Chafant, Charles Caster, H. W. Oliver, Jr., W. M. Semple, M. J. Morhead, Richard S. Brock, Solon Humphreys and Anthony J. Thomas. The following officers were also elected: James Callery, President; Anthony J. Thomas, Vice-President; H. D. Campbell, Secretary and Treasurer; J. L. Kirk, Auditor.

Providence & Worcester.—O. H. Briggs has been appointed Acting General Ticket and Passenger Agent. J. M. Williams has been appointed Acting General Freight Agent in place of A. E. Quackenboss. Both the new officers held similar positions on the New York, Providence & Boston.

Pueblo & State Line.—At the annual meeting held at Pueblo, Col., last week, the following directors were elected: S. H. H. Clark, E. J. Merriman and George C. Smith, of St. Louis, and James N. Carlisle and H. R. Holbrooke, of Pueblo. S. H. H. Clark was elected President, vice David Kelso, resigned.

Ramona & San Bernardino.—The following are the directors of this new California company: G. L. Lansing, James P. Brown, Frederick Madge, C. G. Lathrop and Chas. E. Green.

St. Joseph & Grand Island.—G. M. Cummings has been appointed General Manager, with headquarters at St. Joseph, Mo., to succeed D. McCool.

St. Louis, Arkansas & Texas Terminal.—The first board of directors of this Missouri company is as follows: S. W. Fordyce, of Hot Springs; R. C. Kerens, N. M. Senter and A. A. Berins, of St. Louis, and H. G. Allis, of Little Rock, Ark.

St. Paul, Minneapolis & Manitoba.—James M. Sawyer has been appointed General Freight Agent, with office in St. Paul, to succeed A. L. Mohler, promoted.

San Ramon Valley.—The following are the directors of this new California company: James P. Brown, D. D. Stubbs, W. L. Brown, A. J. Treat and G. L. Lansing.

Sault Ste. Marie & Southwestern.—Major C. J. Wickersham has been appointed Chief Engineer, with headquarters at Chicago.

Spokane Falls & Northern.—The following are the directors of this new road: D. C. Corbin, of New York; A. E. Jefferson, of Hudson, Wis.; James Monaghan, O. B. King, J. N. Glover, F. R. Moore. W. H. Taylor, B. O. Van Houten, J. Z. Moore, E. J. Brichell, W. Hussey, J. J. Browne and A. A. Newbery, of Spokane Falls.

Staten Island Rapid Transit.—At a meeting of the board of directors the following officers were elected for the ensuing year: J. Frank Emmons, President; Samuel Spencer, Vice-President and Managing Director; W. H. I. James, Treasurer; William Knetgen, Secretary.

Toledo, Ann Arbor & North Michigan.—The following directors and officers were elected at the annual meeting: Directors, J. M. Ashley, H. W. Ashley, J. M. Ashley, Jr., D. Robinson, John Cummings, William Baker, A. W. Wright, of Alma, Mich.; E. A. Todd, of Owosso; J. H. Fancher, of Mt. Pleasant; officers, James M. Ashley, President; A. W. Wright, Vice-President; H. W. Ashley, Second Vice-President and General Manager; C. F. Cook, Secretary; B. F. Jervis, Treasurer.

Troy & Tiptonville.—The following directors were elected at a meeting held last week in Troy, Tenn.: John Echols, J. L. Frazier and A. T Sabin, of Louisville, Ky.; Holmes Cummins, of Memphis, and G. B. Wilson, C. J. Crockett and W. Brice, of Troy.

Union Pacific.—Gardiner M. Lane has been appointed Vice-President of the Board of Directors for the purpose of signing bonds secured by mortgage and certificates of stock. His powers and functions as Vice-President are limited to that duty. The following appointments have also been made: Alexander Millar, Secretary; L. S. Anderson, Assistant Treasurer. Frank D. Butrick has been appointed Transfer Agent of the company in Boston.

Valley (Ohio).—The following directors were elected at the annual meeting: J. H. Wade, S. T. Everett and D. L. King.

West Chicago Elevated.—The incorporators of this company are as follows: Richard T. Whelpley, Edgar C. Rosa, William F. Conklin, Charles A. Landy and Orlando Ware.

West Nashville.—The following are the officers of this company: Volney James, President; W. D. Lester, Secretary Bank of Commerce, Treasurer; L. H. Davis, General Manager, Nashville.

Williamstown & Delaware River.—The following board of directors were elected at the annual election in Camden, N. J., this week: Austin Corbin, George de B. Keim, S. A. Caldwell, Albert Foster, Samuel Garwood, J. A. Bodine, Woodward Warrick.

Wisconsin Central.—C. O. Wheeler has been appointed Superintendent of the Northern and Middle divisions.

OLD AND NEW ROADS.

New Companies Organized.—Albion & Corydon; American Midland; Dardanelle & Western; Northern Pacific & Montana; Paris, Choctaw & Little Rock; Ramona & San Bernardino, St. Louis, Arkansas & Texas Terminal; San Ramon Valley; Spokane Falls & Northern; West Chicago Elevated.

Albion & Corydon.—The Louisville, New Albany & Corydon, which was sold under foreclosure last winter, has been reorganized and the name changed as above.

American Midland.—Incorporated in Indiana to build a road from a point in Allen County westerly through the counties of Whitley, Kosciusko, Wabash, Fulton, Pulaski, Jasper, Newton, Cass, White, Carroll, Benton, Tippecanoe, Warren, Stark, Laporte, Porter and Lake, an estimated distance of 320 miles. The capital stock is $4,800,000.

Americus, Preston & Lumpkin.—The contracts will be let in a short time for constructing an extension of the road from Louvale, Ga., westward to the Chattahoochee River, a distance of about 12 miles. B. H. Hardaway is the chief engineer.

Anaheim, Olinda & Pamona.—It has been decided to change the gauge of this road from narrow to standard. It is hoped that that part of the road between Anaheim and Carlton will be in operation during July.

Anniston & Cincinnati.—Tracklaying has been completed across the bridge over the Coosa River, and tracklaying is progressing toward Gadsden, Ala., at the rate of about ½ mile a day.

Atchison, Topeka & Santa Fe.—It is stated that a survey is being made from Concordia, Kan., on the Strong City Branch northwest through Scandia to Superior, Neb., near the state line.

Baltimore & Ohio.—In the tax appeal case of the company vs. the State Treasurer, a decision has been rendered in the Court of Errors and Appeals at Dover, Del., in favor of the state. Between $30,000 and $40,000 in taxes are involved in the decision.

Blackville, Alston & Newberry.—Surveys are now being made from Sallys to Columbia, S. C., a distance of about 35 miles, and also from Kaolin to Newberry, S. C., a distance of about 60 miles.

Buena Vista & Ellaville.—The location of the road from Buena Vista to Columbus, Ga., about 35 miles, is now nearly completed, and the contract for constructing the road will be let very soon by M. S. Belknap, General Manager of the Central of Georgia.

California Central.—The extension from Perris to San Jacinto, Cal., a distance of about 16 miles, has been placed in operation.

Cape Fear & Yadkin Valley.—A preliminary survey has been made for the extension from Fayetteville to Wilmington, N. C., 85 miles, and a second line will be run as soon as the route through Wilmington to the water front has been decided upon.

Central of New Jersey.—An extension of the road from Wilkesbarre to Scranton, Pa., was formally opened last week. Trains have heretofore run over the Delaware & Hudson Canal Company's tracks.

Chattanooga, Rome & Columbus.—The road has been put in operation between Chattanooga, Tenn., and Lafayette, Ga., 25 miles, and the first regular train ran May 8.

Chicago, Burlington & Quincy.—The losses by the strike and consequent loss of business are estimated at $2,000,000 to $3,000,000. The gross earnings for March decreased $1,741,493 from last year, and the net $1,719,980. The loss was chiefly on freight. For the three months to May 1 the decrease in gross earnings is $2,216,300, and in net $2,635,723. The quarterly dividend just declared is at the rate of 4 per cent. per annum, one-half the usual rate, and the notice states that it is paid "out of accumulated surplus." The stock declined about 3 per cent., to 116.

Chicago & Northwestern.—Tracklaying was commenced May 7 on the extension from Ishpeming to Michigamme, Mich., on the Duluth, South Shore & Atlantic, and it is expected that it will be completed by June 1. It is stated that it will then be extended 60 miles to Houghton.

Chicago, St. Louis & Paducah.—Work is progressing on the road between Parker City, Ill., and Brooklyn, opposite Paducah, Ky., a distance of about 40 miles. N. W. Irish, of New Burnside, Iowa, is the contractor.

Cleveland, St. Louis & Kansas City.—A first mortgage of $7,500,000 has been filed in Missouri in favor of the Central Trust Co. of New York.

Cooperstown & Charlotte Valley.—The company has been organized in New York to construct a road from a connection with the Cooperstown & Susquehanna Valley in Otsego County, to the Delaware County line. The company has acquired a lease of the Cooperstown & Susquehanna Valley for 99 years.

Connecticut River.—At a special meeting May 4, the stockholders voted to consolidate with the Ashuelot road. The Ashuelot extends from South Vernon, Vt., to Keene, N.H., and is operated by the Connecticut River as a branch under a 99 years' lease. The stock is all owned in the interest of the Connecticut River.

Cornwall & Lebanon.—The extension from Lebanon, southeast to New Holland, Pa., on the East Brandywine & Waynesboro division of the Pennsylvania, will, it is reported, soon be placed under contract.

Dardanelle & Western.—Articles of incorporation filed in Arkansas to build a road from Dardanelle, Yell County, in a general southwesterly direction through Danville and Waldron to Black Fork, Scott County, near the Indian Territory line, a distance of about 85 miles. The capital stock is $1,700,000.

Dodge City, Montezuma & Trinidad.—The surveyors are west of Montezuma and working toward Trinidad, Colo. The contracts for grading and bridging about 27 miles of the road have already been let. A. T. Soule, Rochester, N. Y., is president.

Duluth, Glencoe & Southwestern.—The survey for this road, recently incorporated, will probably soon be commenced. It is projected to extend from Duluth, southwest through Elk River, Watertown, to Glencoe, and then to Sioux City, Ia., or to a connection with the Union Pacific at Columbus, Neb.

East Tennessee, Virginia & Georgia.—A third survey for the extension to Jacksonville, Fla., will soon be commenced from Hazelhurst, Ga.

Elgin, Joliet & Eastern Coal Branch.—It is stated that the contract has been let for the construction of the road from Gardner northerly to the Illinois River, a distance of about 18 miles, and that construction work will be commenced as soon as the right of way has been secured.

Elgin, Petitcodiac & Havelock.—The contract has been let for an 8-mile extension from the present terminus at Havelock to New Canaan, Brunswick County, New Brunswick. Part of the line, however, will be re-located before construction work will be commenced.

El Paso, White Oaks & Kansas City.—Dispatches state that Morris, Locke & Co. will soon place engineers in the field to survey this line and that construction work will be commenced immediately.

Florence.—The tracklaying has now been completed from Pee Dee, northeasterly about 18 miles to within four miles of Little Rock, and the grading has been finished to Plainview, N. C., on the Carolina Central, ten miles further. The road is a branch of the Wilmington & Weldon. Rice & Coleman, Chester, S. C., are the contractors.

Florida, Railway & Navigation Co.—The Florida Transit Railroad was sold in Jacksonville, Fla., May 7, for $15,000; the extension from the latter place to Plant City, there connecting with the South Florida Railroad, for $100,000, and the Peninsular road for $10,000. The roads were sold by decree of United States Court and were purchased by W. Bayard Cutting, of New York.

Georgia Pacific—Contracts will be let immediately for constructing an extension from Columbus to Johnsonville, Miss., a distance of 134 miles. J. Y. Sage, Birmingham, Ala., is chief engineer.

Houston & Texas Central.—A decree of foreclosure was entered at Galveston, Tex., last week, all opposition having been withdrawn. The decree provides for an upset price sufficient to pay off the first-mortgage bonds, of which about $6,000,0000 have already assented to the plan of reorganization and will receive new securities. The other $2,000,000 remained out of the plan, and will, under the decree, receive cash.

Indianapolis, Decatur & Western.—The sale of the Indianapolis, Decatur & Springfield has been confirmed by the court, and the transfer of the property from the Receiver to the new company was formally made May 7.

International & Great Northern.—The controversy between the officers of the Missouri Pacific and certain security holders of the Missouri, Kansas & Texas, which road is leased to the former, has resulted in the separation of the International & Great Northern from the Missouri, Kansas & Texas; and the International & Great Northern, together with its leased line, the Galveston, Houston & Henderson, is now operated independently. It appears that the stock of the International & Great Northern, which was transferred to the Missouri, Kansas & Texas at the time of the merging of the two roads, has passed into the hands of the Missouri Pacific, or of Jay Gould and his friends, probably as collateral for cash advances. The holders of this stock now, by virtue of its possession, separate the International & Great Northern from the Missouri, Kansas & Texas, and apparently will divert all the business possible from the latter at its southern terminus and turn traffic over the St. Louis, Iron Mountain & Southern. It is said that the Missouri, Kansas & Texas committee which opposes the Gould management has effected a compromise with Mr. Gould and matters will be adjusted.

Jacksonville, Tampa & Key West.—The company has secured control of the St. Johns & Halifax, which extends from Rolleston, Fla. (opposite Palatka), to Daytona, on the eastern coast of Florida, a distance of 49 miles. S. V. White, of New York, was the principal owner of the stock.

Kansas City, Springfield & Memphis.—Holders of the first mortgage 6 per cent. bonds of the company are notified that they will be exchanged (bond for bond) for the 40-year consolidated mortgage 6 per cent. bonds of the Kansas City, Fort Scott & Memphis upon their surrender at the office, within six months.

Kansas City, Wyandotte & Northwestern.—E. S. W. Drought, one of the original projectors of the road, has filed suit against the construction company to recover $65,000 claimed to be due him. About $300,000 of real estate belonging to the company has been attached by the sheriffs. The plaintiff claims this amount is due him for making surveys and securing the sale of the bonds, aside from the 10 per cent. of all bonds voted the company and held as stock of the railroad company by him. An officer of the railroad company states that the suit will be transferred to the United States Court, and that bonds would be given to have the attached property released, and also that while the company may owe him something, it is nothing like the amount sued for.

A corps of engineers is surveying a line from Seneca, Kan., to the Nebraska state line, and it is stated that construction work will probably commence during the summer.

Lackawanna & Pittsburgh.—It is stated that funds have been secured to build the extension from Wayland northeasterly to Geneva, N. Y., about 40 miles.

Lehigh & Hudson River.—The right of way has been nearly all secured for an extension from Greycourt northerly to a connection with the Pennsylvania, Poughkeepsie & Boston at Montgomery, N. Y., a distance of about 15 miles.

Louisville & Nashville.—It is stated that surveys will soon be commenced for branches to Cadiz and Gracey in Trigg Co., Ky.

Louisville, New Albany & Corydon.—The name of this company has been changed to Albion & Corydon.

Los Angeles & Ocean Beach.—Grading on this California road has been suspended, but it is thought that work will be resumed about the last of June.

Manchester & Augusta.—This branch of the Wilmington & Weldon has now been nearly completed from Sumter, S. C., about 18 miles to the Santee River. J. D. Hardin, Sumter, S. C., is the contractor.

McKeesport & Bellevernon.—The stockholders have voted to authorize the increase of the capital stock from $280,000 to $600,000. About six miles of the grading has now been completed. The road is to extend from McKeesport, about 30 miles, to Fayette City, Pa. J. Wainwright is President.

Mexico.—Dispatches state that the government has granted a concession to Louis Huller & Co. to build a road from a point on the line of the Mexican Central through the states of Chihuahua and Sonora, crossing the Sierra Madre Mountains. The road will pass through a rich mineral belt.

Midland (Indiana).—The survey for the extension to Rockwell, 12 miles from the present terminus of the line, has been completed.

Minneapolis, St. Paul & Sault Ste. Marie.—The directors of the Minneapolis & Pacific, Minneapolis, Sault Ste. Marie & Atlantic, Minneapolis & St. Croix, and Aberdeen, Bismarck & Northwestern roads have formally approved the articles of consolidation of the four companies.

Missouri Pacific.—It is stated that surveys will soon be made for an extension of the Pueblo & State Line road southwest from Pueblo to coal fields about 45 miles southwest of the city.

Montana Central.—The company has now under construction a line from Helena to Butte, Mont. Ter., a distance of 73 miles, and also from Helena, 15 miles to Red Mountain. The contractors for the former line are Larson Keefe & Co., of Wickes, Mont. About 30 miles of branches are also being constructed.

Nashville & Knoxville.—The president of the company has offered to build a five mile extension from the main line to Alexandria, De Kalb Co., Ky., if the right of way is granted, and $5,000 of the capital stock of the company is taken.

New York, Mahoning & Western.—Dispatches state that the contract for constructing the road from Red Bank, Pa., to Fort Wayne, Ind., an estimated distance of 317 miles, has been let to George D. Silsby, of Findlay, O., to be completed by January, 1890.

Northern Pacific & Montana.—Articles of incorporation in the interest of the Northern Pacific have been filed to construct the following lines of railroad: From Birdseye northwesterly to Marysville and Empire; from Jefferson City up Boulder Valley and then to Butte City; from a point near Boulder City to a point near Gallatin City; from near Jefferson down Boulder Valley, thence to Elkhorn City; from Missoula to Bitter Root River, and southwardly up the Bitter Root Valley via Stevensville, Corvallis and Skaikaho, to a point near the mouth of the west fork of the Bitter Root River, and thence in a general southerly direction to Ross' Hole; from Drummond thence across the Hell Gate River, and in a general direction west of southwardly up the valley of Flint Creek to nearthe mouth of Flint Creek, thence to Philipsburg, and thence to the Granite mines; from a point on the main line of the Northern Pacific, near Livingston, in a general northerly directly to the mines in the vicinity of Castle in Meagher County; from a point on the main line of the Northern Pacific at or near Billings, thence in a northwesterly direction via Fort Benton and the valley of the Marias River to the northern boundary line of the territory. Also such branch roads to such points in the territory as the company shall from time to time determine. The capital stock is $10,000,000.

Omaha, Dodge City & Southern.—It is stated that surveys will soon be commenced, and that the contracts for constructing the road will be let about July 1. The road is projected to extend from Omaha, Neb., to El Paso, Tex., with a branch from Montezuma to Trinidal, Col. C. E. Gallagher, Dodge City, Kan., is Chief Engineer.

Orange Belt.—Tracklaying has been completed from Tarpon Springs southerly about 32 miles to Petersburgh, Fla., on Tampa Bay, the southern terminus of the road. A line of steamers will soon commence running to Havana, Key West and New Orleans.

Oregon Railway & Navigation Co.—Kilpatrick Bros. & Collins, of Beatrice, Neb., whom we reported last week as receiving the contract for building the branches to Heppner and to Estes, have sublet the former to Corry Bros., of Ogden, Utah, and the latter to Smith & Hale, of Portland, Oregon.

Owensboro, Falls of Rough & Green River.—At the election in Owensboro, Ky., last week, a subscription of $75,000 in bonds was voted the company to aid in the construction of its road.

Paragould & Buffalo Island.—The grading has been completed for 5 miles from Paragould, Ark., east, toward the St. Francis River.

Paris, Choctaw & Little Rock.—Organized in Paris, Tex., to construct a road from that place to the Red River, where connection is to be made with a proposed branch of the Memphis & Little Rock, to be built from Little Rock through the Indian Territory. L. B. Marey is interested.

Pemberton & Hightstown.—It is stated that an electric motor company has offered to buy the road from the Pennsylvania for $75,000, and proposes to run electric tram cars over the road. The mails for points along the line of the road are now carried by wagon, but the telegraph line is still in operation.

Pensacola & Memphis.—It is stated that the contract has been let to the Standard Contracting Company, of Cleveland, O., for the construction of the entire line from Meridian, Miss., to Pensacola, Fla. The surveyors are now running the second preliminary line. One party has reached a point about 15 miles out from Meridian, and the other a point about 40 miles out from Pensacola. The line now forms part of the Warrior Coal Fields road. Wyndham C. Jones, Conneaut, O., is the Secretary.

Philadelphia Underground.—Charters have been granted at Harrisburg for underground railroads in Market and Broad streets, Philadelphia.

Portland & Ogdensburg.—A committee of the directors is considering an offer from the Maine Central to lease the road. The terms are said to be one per cent. on the stock for three years and two per cent thereafter. The city of Portland owns a controlling interest in the road.

Portland & Vancouver.—The engineers are now in the field completing the location of the line, and the contracts for the construction of the road will be let immediately. John R. Wheat, Portland, Ore., is General Manager.

Providence & Worcester.—The lease of this road to the New York, Providence & Boston, announced last week, seems to be assured. The stockholders of the two companies meet to vote on ratification, May 17, but the directors are so sure of approval that they have already begun consolidation of management as noted in another column, and have put on a through passenger car between Worcester and the Stonington steamboat landing.

Ramona & San Bernardino.—Incorporated in California to construct a standard gauge road from a point on the Southern Pacific near Ramona, near Los Angeles, easterly to Crafton, near San Bernardino, an estimated distance of 71 miles. The capital stock is $2,000,000 of which $71,000 has been subscribed.

Richmond & Danville.—The holders of the consolidated 5 per cent. gold bonds, issued under the mortgage of October, 1886, have been given notice that an agreement has been entered into with the Central Trust Co., of New York, trustee, by which the mortgage has been modified and the security given for the bonds has been strengthened in the following particulars: That none of the Northwestern North Carolina Railroad Co. bonds or those of the Western North Carolina Railroad Co. be exchanged. That no further bonds be issued under the authority for the issuance of bonds for the purchase of equipment. That without changing the amount of bonds to be issued per mile, the total amount of bonds authorized to be issued under the said mortgage be $14,500,000 in the aggregate, instead of being unlimited in extent as at present.

Richmond & West Point Terminal Railway Warehouse Co.—Morton, Bliss & Co., of New York, have commenced a suit in the United States Circuit Court

at New York against the company as holders of the controlling interest of the North Carolina Railway bonds. Morton, Bliss & Co. hold 10,500 of these bonds, on which no interest has been paid for several years, and ask that the $6,336,000 common and preferred stock held by RichmondTerminal be sold, and the payment be applied to pay the overdue coupons with interest. An injunction is asked restraining the defendant from transferring the stock.

Rio Grande & Eagle Pass.—Efforts are being made to have the company extend its road southeast about 60 miles to Eagle Pass.

St. Augustine & South Beach.—The road is being extended from Matanza Avenue Junction, St. Augustine, Fla., a distance of 3 miles, to South Beach.

St. Johns & Halifax.—The road has passed into the control of the Jacksonville, Tampa & Key West.

St. Louis, Arkansas & Texas Terminal.—Incorporated in Missouri to build a road from a point on the St. Louis, Arkansas & Texas at Malden, Dunklin County, northerly to a point on the Mississippi River, opposite Grand Tower Ill. The road will pass through the counties of Dunklin, Stoddard, Cape Girardeau and Perry, and the distance will be about 90 miles. The capital stock is $900,000.

San Ramon Valley.—Articles of incorporation filed in California to build a road from a connection with the San Pablo & Tulare, at Avon, Contra Costa County, southeasterly, to a connection with the Central Pacific, at or near Pleasonton, Alameda County. The capital stock is $1,050,000, of which $35,000 has been subscribed.

Savannah & Columbus.—Three parties of engineers are now in the field surveying this proposed line of the Central of Georgia from Savannah to Columbus via Americus and Buena Vista.

Seattle, Lake Shore & Eastern.—The contract for grading the first 60 miles of the extension from Spokane Falls westerly to Big Bend has been let to Burns & Chapman. Work is to be begun at once, according to the provisions of the subscription of $175,000 to the capital stock of the company by citizens of Spokane Falls. Forty miles of this branch are to be completed in time for the transportation of this season's crops.

Sioux City Rapid Transit.—Work on this road has been begun. Mark Naughton has the contract for grading the 3½ miles of surface line, and preparations are nearly completed for the building of 2½ miles of elevated structure. F. A. Hill, Chief Engineer, is receiving bids for engines and rails.

Somerset.—About half the grading has been completed on the 9-mile extension from North Anson, Me., to Canatunk Falls. S. C. Mills & Co., Norridgewock, are the contractors. It is expected that the extension to Bingham, 8 miles, will be built this summer.

South Pennsylvania.—At a meeting to consider the details of the completion of the road, held in New York May 9, the plan proposed by the heavy stockholders was ratified. It was previously agreed upon by the Vanderbilts, Andrew Carnegie, Dr. Hostetter, of Pittsburgh; Ralph Bagaley, of Pittsburgh, and others. It is to the effect that the stockholders reorganize the company at once, pay in 20 per cent. assessment, and that $10,000,000 of bonds be issued. The sale of bonds and the assessment will bring in $13,000,000, which will finish the road. It is said that about two-thirds of the proposed issue of bonds have been subscribed for by the Vanderbilts, Hostetter, Carnegie and Bagaley, but Mr. W. K. Vanderbilt stated that the Vanderbilt estate would not take a leading part in the movement to complete the road, and the Pennsylvania road will, it is said, push its suit for an injunction restraining the stockholkers from taking any action.

Spokane Falls & Northern.—Incorporated in Washington Territory to construct a road from Spokane Falls northwesterly to a point on the Columbia River in Stevens County, and to operate a line of steamers in Washington and Idaho territories and in British Columbia. The capital stock is $2,500,000.

Tacoma, Ellensburgh & Conconnully Railway & Navigation Co.—The survey for the railroad to be built by this company is now in progress, and construction will be commenced when it has been completed. The road will start from Ellensburgh, Kittatas County, Washington Territory, taking an easterly direction by the most practical route to a point on the Columbia River, a distance of about 32 miles.

From the railroad landing at the river, two boats will run up the river to tap the Big Bend country and the new mining fields of Conconnully. One of the boats is now being constructed, and the other will be finished by the time the road is put in operation. The road is being built by L. E. Post & Co., of Tacoma, W. T., and the financial support of the company is furnished by English capitalists. The road, when built, will open up a hitherto inaccessible mineral and wheat country. L. E. Post is President.

Union Pacific.—The patronage of the "Overland Flyer," the fast train leaving Council Bluffs at noon, and of the corresponding train eastward, has become so large that these trains have been made limited, and will hereafter have no common passenger cars. Pullman sleepers are run through by these trains between Council Bluffs and San Francisco, Council Bluffs and Portland, Council Bluffs and Denver and Council Bluffs and Los Angeles.

Vancouver, Klickitat & Yakima.—The grading on the first five miles from Vancouver has been completed. Samuel Browne, Vancouver, is president.

Wabash.—Foreclosure proceedings have been begun in the Federal Courts at Springfield and Chicago, Ill.; Indianapolis, Ind.; and Toledo, O. Of the $28,800,000 (the amount of the bonds), which it is expected the road will bring, $20,000,000 will probably be represented in bonds at the sale, that amount having agreed to the reorganization plan. The balance, $8,800,000, will be offered in cash by bondholders agreeing to the plan. The holders of second mortgage bonds of 1879 are offered a new second mortgage for the principal of their bonds and new first mortgage bonds for overdue coupons to November, 1887.

Waco & Brazos Valley.—The locating survey was commenced at Waco last week, and will be completed to Cameron, Tex., 53 miles, as soon as possible. Contracts for grading will be let immediately. Stephen Turner, Waco, is chief engineer.

Western Maryland.—A charter has been granted the Baltimore & Harrisburg Division to construct a road from Ortunana, Adams County, Pa., the present Western terminus, to a connection with a branch at the Maryland state line, a little west of Blue Ridge Summit, Franklin County. The capital stock is $250,000. David Mills, of Gettysburg, Pa., is the president.

West Chicago Elevated.—Articles of incorporation filed in Illinois to construct an elevated road in Chicago. The capital stock is $5,000,000.

Wheeling & Lake Erie.—It is announced that the entire issue of 40-year five per cent. bonds, amounting to $1,500,000, offered to the public for subscription last week by Poor & Greenough, in New York and London, has all been taken. The sale of the bonds insures the construction of the extension from Bowerstown, Ohio, to Wheeling, W. Va.

TRAFFIC AND EARNINGS.

The report of the Michigan Central Company for the year ending Dec. 31 shows:

	1887.	1886.	Inc. or Dec.	
Gross earnings	$14,164,490	$12,295,828	I.	$1,868,662
Oper. expenses	9,875,246	8,404,679	I.	1,470,567
Net earnings	$4,289,243	$3,891,149	I.	$398,094
Int. and rentals	2,535,929	2,576,984	D.	41,055
Balance	$1,753,314	$1,314,165	I.	$439,149
Paid Can. So.	540,870	407,335	I.	133,535
Net income	$1,212,444	$906,830	I.	$305,614
Other income	30,205	45,190	D.	25,985
Total income	$1,242,649	$952,020	I.	$280,629
Dividends	740,528	374,764	I.	374,764
Surplus	$483,121	$577,256	D.	$94,135

The report of the Land Department shows:

	1887.	1886.	1885.
Land sales	$43,306	$94,652	$42,657
Timber sales	97,145	106,827	55,202
Total sales	$140,451	$201,479	$97 859

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of March:

	1888.	1887.	Inc. or Dec.	P. c.
Atch., T. & S. Fe.	$1,233,238	$1,762,628	D. $529,390	30.0
Net	451,041	974,157	D. 023,116	64.9
California South.	148,773	143,452	I. 5,321	3.5
Net	26,442	75,817	D. 49,375	65.3
Cairo, V. & C.	54,619	63,543	D. 8,924	12.6
Net	17,746	20,549	D. 2,803	10.0
Canadian Pac.	908 523	719,255	I. 249,268	34.6
Net	168 991	51,934	I. 117.057	229.4
Carolina Central.	51,787	47,636	I. 4,151	8.5
Net Df.	13,484	19,413	D. 5,929	21.0
Den. & R. G.	541.846	603,376	D. 61,530	10.2
Net	135,370	252,683	D. 117.313	46.4
Den. & R. G. W.	105,004	84,546	I. 20,458	23.8
Net	20,865	22,385	D. 1,520	4 5
Kentucky Cent.	76,377	77,227	D. 850	1 1
Net	19,101	24,483	D. 5 382	20.8
Louv. & Nash.	1.261,202	1.327.519	D. 66,317	4.9
Net	393,581	544,140	D. 150,559	27.5
L. N. O. & Tex.	182,458	167,852	I. 14,606	8.3
Net	35,417			
N. Y., Ont. & W.	114,698	109,968	I. 4,730	3.6
Net Df.	90 9	11,290	D. 10,381	99.9
Ohio & Miss.	292,920	390,697	D. 97,777	24.9
Net	69,002	155,381	D. 86,379	55,4
Ohio River	26,243	19,084	I. 7,159	36 8
Net	8,389	4,686	I. 3,703	75.0
Phila. & Erie.	277,046	326,297	D. 49,251	15 0
Net	96,716	156,967	D. 60,251	38,4
Pitts. & West	126 378	169,583	D. 43,205	25.4
Net	29,982	33,628	D. 3,647	9.1
Sea. & Roanoke.	60,908	51,856	I. 9,052	17.6
Net	20,236	23,501	D. 3,265	13.0
Southern Pacific:				
Texas & N. O.	137,685	102,896	I. 34,789	33.3
Net	51,640	41,266	I. 10,374	24.4
Louisia. & West.	90,150	66,373	I. 23,777	34.8
Net	52,302	28,931	I. 23,461	82.1
Tol. & O. Cent.	79,659	78,837	I. 822	1.0
Net	24,554	25,528	D. 974	3 9
Union Pacific	2,513,108	2,571,365	D. 58,257	2.3
Net	1,137,344	1,094,419	I. 32,825	2.9
Total (gross)	$8,342,622	$8 883,990	D. $541,368	6.1
Total (net)	1,914 611	2,166,605	D. 251,994	11.9

Three months—Jan. 1 to March 31:

	1888.	1887.	Inc. or Dec.	P. c.
Cal. South	$472 599	$584.081	I. $88,518	22.9
Net	148,266	191,935	D. 43,669	22.5
Cairo, V. & C.	165,985	172.030	D. 6,045	3 5
Net	41,516	41,875	D. 359	0.8
Canadian Pac.	2,607,722	1,873.394	I. 734,328	39.2
Net	238,199	3,997	I. 234,202	
Carolina Central.	150,031	140 651	I. 9,380	6.4
Net	56,062	55,715	I. 347	0.6
Den. & R. G.	1,642,984	1,701.310	D. 58,326	3 4
Net	401,399	684,991	D. 283,592	41.4
Den. & R. G. W.	284.412	226,822	I. 57,590	25.2
Net	49,768	56.234	D. 6,466	10.7
Kentucky Cent.	220,387	208,650	I. 11 737	5.3
Net	70,821	68,793	I. 2.028	2.9
Louis. & Nash.	3.848,414	3,725,304	I. 123.110	3.3
Net	1,209,765	1,408,364	D. 198,599	14.0
Lou., N. O. & T.	649.645	565,145	I. 84,500	14.8
Net	188,145	181,570	I. 6,575	3.3
N. Y., O. & West.	330,406	286.539	I. 43,867	15.0
Net	7,686	13.928	D. 6,242	46.1
Ohio & Miss	888,425	996,944	D. 108,519	10.8
Net	225,505	326,704	D. 101,199	30.9
Ohio River	80,958	51,715	I. 29.243	56.8
Net	28,880	13,799	I. 15,081	115.4
Phila. & Erie	772,842	843,849	D. 71,007	8.4
Net	258,373	359,345	D. 100,972	27.8
Pitts. & Western.	402,636	447,790	D. 45,154	10 0
Net	102,605	93,545	I. 9,060	9 6
Sea. & Roanoke.	170,345	142,758	I. 27.587	19.0
Net	61,033	43,255	I. 17.778	39.5
Tol. & Ohio Cen.	291,128	242,527	I. 48.601	19.8
Net	110,894	92,015	I. 18.879	19.5
Un. Pacific	6,158,878	5,984,632	I. 174.246	2.9
Net	2,054,229	1,969,730	I. 84,499	4 2
Total (gross)	$19.137.797	$17,994.141	I. $1,143,656	6.3
Total (net)	5,243,146	5,595,795	D. 352,649	6.3

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Proposed Amendments to the Inter-state Commerce Act.

The Senate Committee on Inter-state Commerce proposes the following amendments to the Inter-state Commerce act.

The sixth section of the law is proposed to be amended so as to require that the printed schedules of rates shall be kept "open to public inspection" and "accessible to the public;" that reductions in the published rates shall only be made after three days' public notice, instead of without previous notice as at present, and that the provisions in regard to advances and reductions in rates shall apply to joint tariffs made by connecting roads as well as to local tariffs. It is proposed to amend the tenth section of the act, the criminal penalty section, by making those convicted of violating the act liable to imprisonment for two years, in addition to the fine already provided for, or both fine and imprisonment, when the offense is an unlawful discrimination in rates for the transportation of passengers or property.

The committee proposes three provisions in regard to underbilling. The first is that officers, agents, or employés who by means of false billing, false classification, etc., assist or permit any person to obtain transportation at less than the established rates, shall be deemed guilty of a misdemeanor, and shall be subject to a fine of $5,000, or imprisonment for two years or both. The second is that any person, or the officer or agent of any corporation, who delivers property to a common carrier who shall by false billing, false weighing, etc., whether with or without the consent or connivance of the railroad or its agents, obtain transportation for property at less than the established rates, shall be deemed guilty of fraud, which is declared to be a misdemeanor, and shall be subject to fine of $5,000, or imprisonment for two years, or both. The third provision makes subject to the same penalties any person who, by the payment of money, etc, or by solicitation, shall induce any railroad or any of its officers or agents to discriminate unjustly in his favor, and also makes such persons liable with such railroad in an action on the case to be brought by any consignor or consignee discriminated against for all damages resulting therefrom. Other amendments proposed are one to permit railroads to carry free destitute and homeless persons transported by charitable societies, and one to permit railroads to give reduced rates to municipal governments for the transportation of indigent persons.

Traffic Notes.

Passenger rates from Chicago to Boston continue unsettled, the Niagara Falls Short Line (Wabash) making repeated reductions, which indicate that it purposes to maintain its rate below that of the Chicago & Grand Trunk, which latter is $2 less than the price by direct lines.

The Chicago, Burlington & Northern announces freight rates from Chicago to St. Paul, on business from the seaboard, on a basis of 31 cents first-class, thus making the through rate from New York and common points $1.05, the lines east of Chicago insisting upon 75 cents, the full rate, as their proportion.

The opening of the Denver, Texas & Gulf affords Denver and Colorado points a means of getting lumber from Texas and gulf ports at 35 cents per 100 lbs. This has induced the Union Pacific to reduce its rate on lumber from Portland, Or., to 40 cents, it hitherto having been 55.

The Chicago, Milwaukee & St. Paul has issued a new tariff fixing the rate on grain from St. Paul to the seaboard at 33 cents per 100 lbs., and on flour at 35.

It is announced from Chicago, but also denied, that the Chicago & Grand Trunk has made contracts with all the prominent dressed beef shippers of Chicago for carrying their products to Boston at 45 cents per 100 lbs. for a year. The shippers have for several weeks combined to ship no dressed beef over the Grand Trunk at any price.

It is reported that the West Shore and Lackawanna lines are taking grain from Chicago to New York at 20 cents per 100 lbs.

On Friday May 5, over 7,000 immigrants arrived in New York. Castle Garden was so crowded that those going out on the railroads could not be adequately accommodated and none of the people started West until the next day.

The overland roads between the Atlantic coast and Colorado, in making rates to compete with the new line via New Orleans, have fixed the prices on some commodities from New York the same as from Chicago. Sugar and soda ash in carload lots to Colorado points are 90 cents per 100 lbs. from either city, and 85 from St. Louis; building cement is 70 cents from New York and Chicago and 65 from St. Louis.

The New York Produce Exchange has sent a lengthy complaint and petition to the Inter-state Commerce Commission concerning the carrying for western grain and produce to European ports at unreasonably low rates. All of the trunk lines and their western connections are made defendants, and it is asserted that freight for export has been carried from the West to New York at 50 per cent. less than tariff, thereby tending to destroy the business of New York merchants.

It is stated that the Chicago, Burlington & Northern has made an agreement with some Lake line to transport freight from New York and common points to Chicago on a basis of 44 cents first class, thus enabling the road to make the rate between New York and St. Paul 75 cents (first class), the same as by the Lake Superior lines.

East-bound Shipments.

The east-bound through shipments of all freight, except live stock, from Chicago for the week ending May 5 amounted to 50,893 tons, against 53,537 for the week previous, and 29,899 for the same week in 1887.

Lake Rates.

Nearly or quite all the vessels which have wintered at Chicago have made contracts for freight at about 2 cents per bushel for corn, 2¼ for wheat, and 1½ for oats, to Buffalo. Wheat has been chartered from Duluth at 3⅛ cents. Ore has been contracted from Marquette to Ohio ports at $1.25, and coal from Buffalo to Duluth at 60 cents per ton; coal from Buffalo for Chicago has been taken at 75 cents.

The Trunk lines and roads in the Central Traffic Association have agreed with the Lake lines on rates for east bound traffic, lake and rail (except grain), from Chicago to the seaboard, at the following differentials below all-rail rates: 15, 13, 10, 5, 5, 5.

The Lake Superior boat lines have reduced lake and rail rates from New York and Boston to St. Paul 5 cents, making first-class 75, instead of 80, as heretofore.

Iowa Freight and Passenger Rates.

The General Freight Agents of the Iowa lines have agreed upon local tariffs, complying with the Iowa distance table prescribed by the state Commissioners under the new law. The tariff goes into effect May 10. On corn the rate for 100 miles will be 11 cents, and on wheat and flour for the same distance 15 cents. The rates are strictly according to distance, so that the shortest line between two points will naturally get the bulk of the business. The Illinois Central has issued a circular canceling all existing rates between points in Iowa. The General Passenger Agents of the Iowa lines have agreed to make all local rates 3 cents a mile.

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